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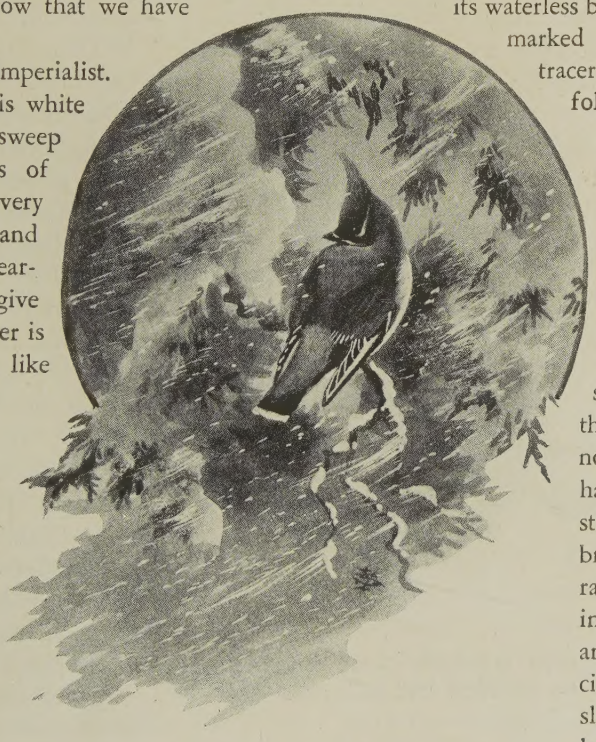
A Prince of the White Country

By JOHN LINDSEY BLACKFORD

Illustrations by Edmund J. Sawyer

THERE ARE days etched on one's memory as though done by steel-point—days that are cut cameo-like upon the past. Yesterday, sunlit, snow-robed and crystal clear is such a one in my gallery of remembrances. Into it there came a troop of feathered adventurers as intrepid as are ever found in Winter's domain. Truly, whenever we chance to meet the Bohemian or northern waxwings we may well avow that we have lived a day.

Winter, we know, is an imperialist. When comes his season, his white armies of snow and frost sweep down with deadly thrusts of their icy shafts. Not until every crag and plain, every lake and river within his realm is wearing his silver livery does he give us pause. The soul of Winter is hard but it is shining too, like bright steel.



"—SNUGLY SAFE FROM THE WIND—"

Typical of Winter in brightest character, appropriate to his most brilliant settings, are these elegant northern waxwings, winged aristocrats of the North Country. When from sub-Arctic America their knightly bands come adventuring below the boundary, we know that we have seen the avian personification of beauty, dignity and grace. These valiant wanderers are the snow-time heirs to the cedar bird's place in our hearts. While countless others of the feathered clan find haven in tropic lands, the northern waxwing chooses to remain with us—a prince of the White Country.

It was yesterday that I pushed through the dense undergrowth that bordered a bare oval depression in the woods. Raising a hand to shield my eyes against the dazzling reflection from the snow, I peered at the tall aspen trees upon the farther side. In spring and summer this depression is a shallow lakelet in the forest; but now over its waterless bed was spread the glinting snow, marked here and there with light traceries, trails of the smaller wildfolk of the snowy woodland.

I had glimpsed the commotion of many wings as a large flock of birds broke from flying formation to alight in the high tops of the half dozen tallest quaking aspens that were limned gray-white beyond me against the hill. My descent of the nearer slope of the depression and through its bordering cover had not disturbed them. They were perhaps a hundred yards away as, standing in the open, I quickly brought my glasses into play. A rapid half spin of the central focusing wheel, a slight readjustment, and there in the luminous magical circle of the object lenses were the slender sylph-like trees and their load of feathered beauty. Beyond a doubt they were waxwings as proclaimed by their crested heads, the characteristically graceful forms and the deep blended colors.

Slowly I skirted the margin of the empty lakelet, keeping close against the dense thicket that hemmed it in, but

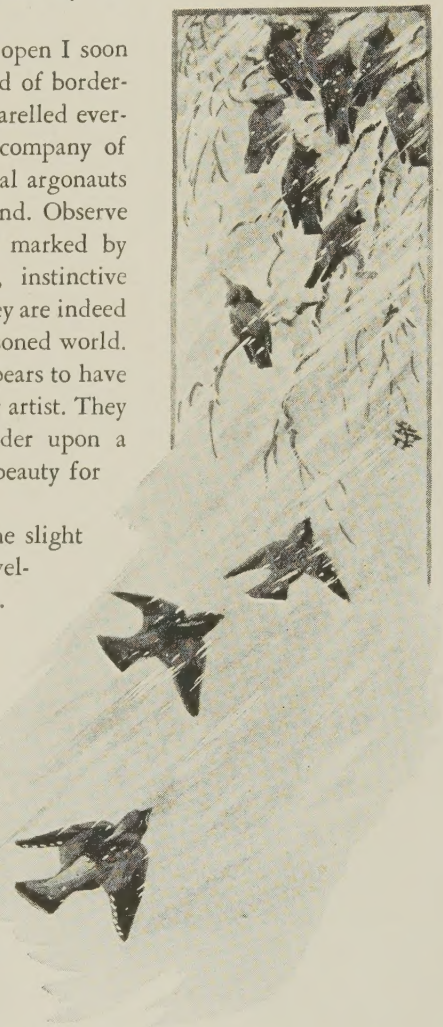
making no other attempt at concealment. Occasionally I paused to survey the scene, taking note of what attention the flock paid to my approach, and thinking to capture and hold some of that beauty ere it should depart. Once, as I studied them, a small group raised and passed in unhurried flight from out the wide field of view of my binoculars. A slight turn and I had caught them again to watch them perch in a bare, young tamarack and a scraggly bent willow.

Presently, at a distance of a dozen paces from the grove, I ended my careful advance, since now they might be studied in detail. A majority of the eighty or more remaining birds were keenly but quietly observant, their proud crests signaling their alert interest. Some in light mood continued changing their perches, one limb for another and one treetop for the next. Others preened plumage of princely elegance. Meantime a pleasant and friendly converse was maintained by the troop.

Circling gradually into the open I soon saw them against a background of bordering birches and the white-apparelled evergreens on the hill. What a company of avian gallantry was here; aerial argonauts are they of winter's argent land. Observe how their courtly manner is marked by seemly decorum and gentle, instinctive courtesy. Regal adornments they are indeed of this gleaming, snow-caparisoned world.

Each of these waxwings appears to have been hand-painted by a master artist. They give us reason anew to ponder upon a creation that offers such rare beauty for the mere beholding of it.

The birds were enjoying the slight warmth of the sun, made welcome by the brisk, chill air. Then, by fives and sixes, and finally in a band of twenty or more, they winged across the shining open of the lakelet to join those that had preceded them into the willow and tamarack. At last, rising and wheeling together, they disappeared from sight out over the valley woods, gone on their glamorous way. Such a meeting with them in the wildness is one I think that is certain to remain with us, a talisman of birdland's beauty, another key to the appreciation of Nature's fine arts.



"—BELATED MEMBERS CAME HURRYING IN TO JOIN THE SLEEPERS."

In November, when most cedar waxwings have migrated from our upper tier of states, our cavalier adventurer arrives and may be found ranging the snowbound area in flocks often numbering into the hundreds. Its appearance in any one locality is likely to be irregular, the birds being seen in abundance and then not observed again in numbers for some time. Generally the Bohemian roams southward as far as Maryland (although it is relatively rare in the East), Colorado, and northern California, while excursions to Arizona, and to the Mojave Desert and San Diego are on record.

In America the nesting range of this, the single circumpolar species, extends through the coniferous regions of Canada from Keewatin to British Columbia and northward to Mackenzie and Alaska.

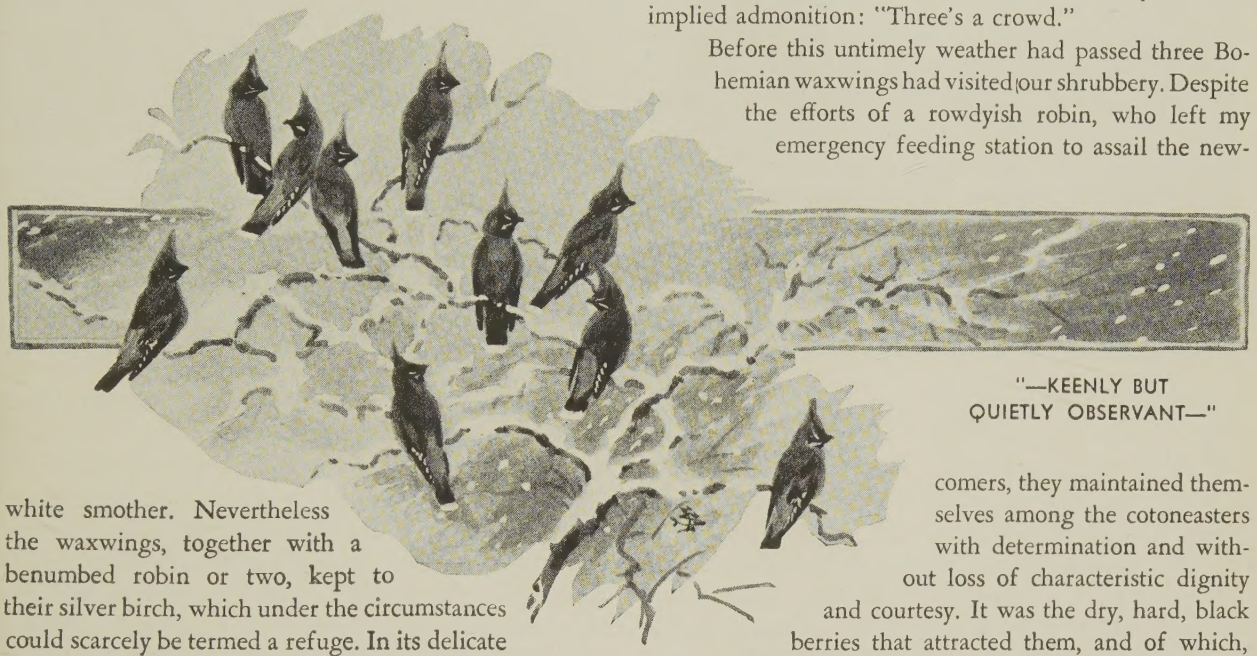
Not infrequently passersby along wintry sidewalks at home may espy this feathered courtier, since he is also a not unusual commuter to town and suburban districts. Here, too, where he finds us in our native haunts, he is more indifferent to our near presence; and to see from below a company of them in the trees that arch over the walk is a somewhat common experience. They will flock excitedly, a little forgetful of courtly manner perhaps, to frozen crab and other apples left hanging in the higher branches; and I have watched them sharing with flickers the seedy well-preserved fruit of Virginia creeper.

Should the exquisiteness of the greater waxwing be all yours yet to discover, you will find, when you meet him, a bird of superlative contour and coloring. The entire soft body plumage may be described as of fawn hues. The drab of the back shades into the ash of the lower back and upper tail coverts. The conspicuous crest that so enhances the appearance of its owner is fawn also, blending in front into the bright russet of the forehead. A similar suffusion colors the cheeks. A throat patch and the distinctly defined frontal stripe running through the eyes are velvet black. Slaty black wings are distinguished by a white band and also by the narrow margining of yellow and white on outer webs and tips of flight feathers. At their ends the shafts of the secondaries expand into the unique and curious scarlet sealingwax appendages. These glossy tear-shaped droplets are a brilliant feature possessed by few others of the avian world. The blackish tail is terminally banded with vivid yellow, while the under-tail coverts are pure cinnamon-rufous, a detail to be noted in identification.

In the closing days of last March a storm most unseasonable in its severity was sweeping our western states. Along the continental divide it assumed blizzard proportions, while throughout the lesser flanking ranges, as between the high Kootenais and the forested crests of the McMillans, the driving snow and accompanying cold appeared scarcely less formidable. Before Winter's grim revanche, early bird migrants were

in distress and several northern waxwings I observed on the second afternoon of the storm deigned to take shelter. They did not huddle about the foundation of the house as did many juncos and varied thrushes, or yet like most of the robins cling to vines about the chimney; rather, they perched nearby upon the lower limbs of a silver birch, quite in the lee of the house, but by no means fleeing the elements.

At intervals freezing gusts drove the slanting flakes into swirling eddies; occasionally among the farther trees the snow blown from their branches enveloped them in a white smother. Nevertheless the waxwings, together with a benumbed robin or two, kept to their silver birch, which under the circumstances could scarcely be termed a refuge. In its delicate line and form, came the thought, the waxwings had found gracefulness arboreally corresponding to their own.



"—KEENLY BUT QUIETLY OBSERVANT—"

A lone individual encountered later was snugly safe from the wind where snow had been moulded over the scaly green boughs of a juniper. Focusing upon him brought the snowy arch and its occupant close before my eyes. Here, framed in the white aperture, pictured upon a dark verdant background, was surpassing beauty, from which the heart truly gains in experience.

At six on the same afternoon I discovered the flock, in which I counted seventy-four, settling apparently for the night among the bare, interlaced branches of two young larches. These young trees were but a few feet from a small dwelling which, however, was surrounded on three sides by forest growth. Each had tucked his head beneath a wing and with this feather coverlet as his only bedding was prepared for a second night of merciless wind and rapidly increasing cold.

With an interested companion I approached finally to within five or six yards to survey this hardy, brave little group. There remained little more than an hour of the sullen darkening day. Several times belated members came hurrying in to join the sleepers. How they made their rendezvous so confidently we who watched them could not say. The snow continued to swirl and eddy about them, while from over the ridge of a nearby roof sharp flurries of the blizzard bore down, lifting and whipping their plumage. When Winter harries us at our tasks or drives us within doors, they can withstand his harsher moods, as well as weather his milder vagaries.

Soon after we had drawn away, a neighbor joined us. Again we moved toward them, yet we were still twice the distance of our former closest point of observation when almost half the flock suddenly took flight and quickly were lost among the falling flakes. A long pause and cautiously our advance was renewed. Swiftly all the remaining birds deserted their haven and sped away beneath the low gray ceiling of the storm, clearly with the implied admonition: "Three's a crowd."

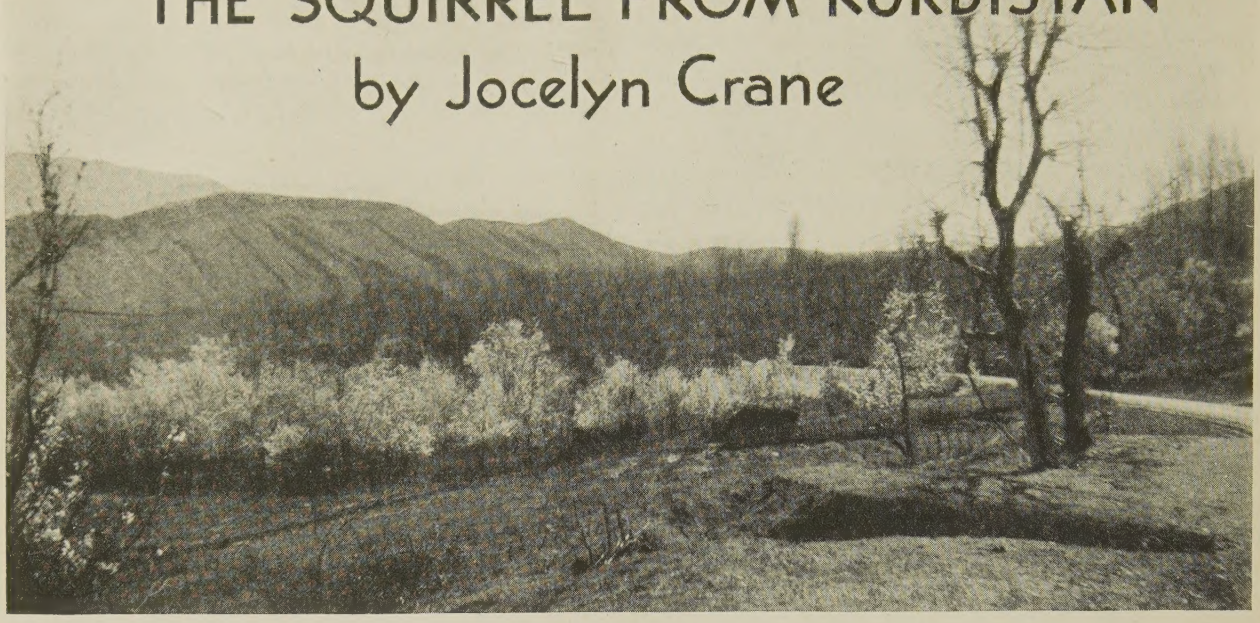
Before this untimely weather had passed three Bohemian waxwings had visited our shrubbery. Despite the efforts of a rowdyish robin, who left my emergency feeding station to assail the newcomers, they maintained themselves among the cotoneasters with determination and without loss of characteristic dignity and courtesy. It was the dry, hard, black berries that attracted them, and of which, notwithstanding the difficulties of swallowing so rough a morsel, they partook freely. The presuming robin, who was himself filled with berries (plus oatmeal and apple), could conceive of no reason why he should share my hospitality with either juncos or waxwings. Fortunately the latter made the distinction between his reception and my own and, while commonly of a friendly temperament, were on this occasion almost confiding. They seemed sincerely appreciative of fare so providentially left from an autumn long past, and their unassuming and artless behavior during the two hours they tarried was both absorbing and diverting.

All too seldom did we see these gallant rovers, and now, as traces of the storm vanish, their rendezvous with spring is in the North. Only Winter, the white raider, can bring them back again. Despite the fact that three other seasons lie ahead, holding within their gay, glad days the renewal, the growth and the fruition of all life, their return is a tryst that we shall not forget, and which even as they leave us we anticipate. We do not begrudge them their home-going, and their family life, lightly borne through the long bright summer days.

In the waxwing we see the perfection of the beautiful in our crystal-clad wonderland. On him this crested chevalier, this Prince of the White Country, Winter has bestowed his accolade, his chevron of knighthood.

SHADRACH, THE SQUIRREL FROM KURDISTAN

by Jocelyn Crane



SHADRACH was christened one raw March day in Kurdistan, that out-of-the-way place in the far corner of the map where Turkey, Persia and Iraq come close together. I was typing notes by the resthouse fireplace while the squirrel dozed on my arm, his favorite perch ever since his discovery that it shook like a branch in a freakish wind when I tapped the keys. Suddenly the old caretaker, always a frightening sight in his great turban and shaggy mustache, threw open the door and stumped in with a load of wood. The combination of cold air and noise so startled my new pet that he leaped to the floor, scurried in a frenzied circle around the table legs and then ran straight into the blazing fireplace. For an interminable second he disappeared in the flames; yet almost before I could move he was out again, whimpering in a high falsetto, streaking across the room and up the rough stone wall to hide in a hole in a rafter.

With a medicine dropper full of his goatsmilk supper, I coaxed him down and soothed him. By the greatest good fortune, he had suffered no real hurt; his fur was singed, his whiskers were stubble and his tail looked exceedingly tired, but these matters would be soon mended. As compensation, he had learned forever the danger of fire, and he had acquired a name. What could possibly be more fitting than "Shadrach?" He, too, had been cast into a fiery furnace and emerged unscathed—not counting the whiskers; he had the convex nose of a high-born Hebrew; and, finally, he had been carried into captivity. If I, his captor, was not a king in Babylon, I was, at least, his boss in Kurdistan, which is not so very far away from that ancient river land. So it was that Shadrach was named, on the third day of his sojourn in the house.

It had been a great occasion when a small boy in a very large turban had reached inside his scarlet jacket, pulled out a squirming bit of gray fur and sold it to me for a square Iraqi coin. I had been seeking a young squirrel for a friend. The grown squirrels, although common in the orchards of that part of the mountains, were always so aloof, tearing around in the tree-tops on their own invisible businesses and wisely staying clear of bad little boys with slings. It was, in fact, difficult to learn anything at all about the squirrel folk's lives; by keeping very still I had been able to see only that they were small chaps, somewhat like a cross between the red and gray squirrels of our own woods, with gray backs, creamy undersides and slightly scraggly rufous tails. This baby

PHOTOGRAPH COURTESY N. Y. ZOOLOGICAL SOCIETY

SHADRACH HIMSELF

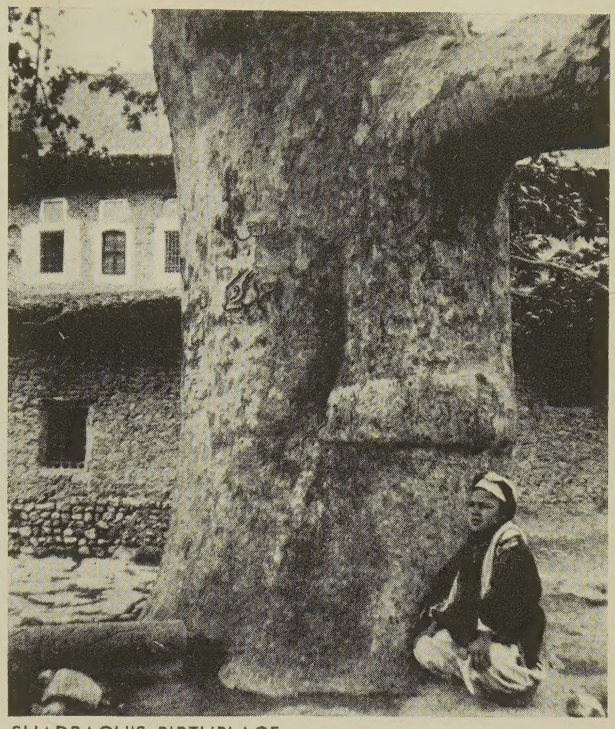
The subject of our story was so named because of his harrowing experience in the author's fireplace

had come to me straight from his leaf-lined hole in the great plane tree that grew in the courtyard of the village mosque; as he was at just the proper age for taming, I should be able to bring him up and watch his ways.

An old gourd with a small opening and a piece of flannel proved to be a perfect nest in which Shadrach at once made himself at home. Here he slept at night and through many daytime hours as well. The rest of the time he ran as he pleased in the big main room of the resthouse, where I studied the insects I caught in the mountains and wrote my notes on the lives of larger creatures.

In the days that followed, Shadrach learned a great deal. Within a week he came to scorn his milk, eating almonds and dates, walnuts and dried apricots instead. He went for walks on a lead, attached to a comfortable harness made out of bits of ribbon, and sprang cannily into my pocket at the approach of dogs or strange humans. He played endless games with himself, running up and down the walls and me without discrimination, and for naps was equally at home in my lap or on my arm. He never went near the fire again, although I caught him once or twice thoughtfully twiddling his brand new whiskers as he gazed wide-eyed into the flames.

One night he had callers. As I sat reading, there came a minute sound, and then, through a tiny crack in the door squirmed two small, brown animals with large eyes and long, plumed tails. I recognized them as wild rats from the mountainside behind the house. They sat up and sniffed, while the snowy whiteness of their undersides gleamed in the firelight, and they showed a length of whisker which put Shadrach's embryonic set to shame. Dropping once more to all fours, they made their way along the wall to the old gourd where the squirrel lay curled asleep. In front of it were the remains of his supper—walnut crumbs and an alluring bit of date. As the visitors mumbled daintily, Shadrach thrust his nose from



SHADRACH'S BIRTHPLACE

The giant plane tree that stands in the courtyard of the mosque in Shaqlawah. High on its trunk is the hole leading to the nest where Shadrach was born

his door, while I, expecting trouble, held my breath. The rats, startled, retreated several feet. The squirrel stuck his whole head out, looked the pair over with sleepy eyes, sniffed, grunted—and went back to bed. The rats visibly sighed with relief, finished their feast, ran back along the wall and vanished through the same incredible crack by which they had entered.

After that the rats returned almost every night. Sometimes Shadrach awoke and blinked a greeting, but usually he never appeared at all, and soon his guests even stopped their wary watch of the hole in the gourd.

Whether or not the practice was in part developed because of the rats, Shadrach at this time began to hide superfluous almonds in corners of the furniture, or in the pot of earth in which he liked to play. Sometimes, too sleepy to hunt up a corner, he simply went through the motions of digging a hole in the stone floor, inserting the nut, putting back the "earth", and pounding the nut far in with his front teeth. Although the treasure naturally remained quite unburied after this performance, he would go off perfectly happy, to discover it hours later with a comical expression of surprised delight. As he never had an opportunity to watch the way of another squirrel with a nut (all of our walks were on the barren mountainside), his digging motions must have been purely instinctive. Even out of doors he never learned to dig a really deep hole, but left the tip of the nut sticking nakedly out of the ground for all the world to see.

All too soon it was mid-April, and time to begin the

A YOUNG NATIVE OF KURDISTAN

This is Hossein, who found Shadrach and brought him to the resthouse. In his arms is a white kid, another of the author's pets

journey home, a third of the way round the earth. Long before, I had decided to take none of my various pets, which included infant magpies, caterpillars, turtles and a pair of partridges, with me; travel in the East with a pile of even wholly lifeless luggage is difficult and expensive enough, and animals, under the best of conditions, are not happy in cars and boats and trains. Shadrach, however, had become so much of a person that the idea of leaving him behind suddenly seemed unthinkable, so at the last minute I weakened and packed his gourd and a bag of nuts.

I then discovered that Shadrach had vanished altogether. The rooms were forlornly bare; the Ford that was to take us down into the plains as far as Mosul was piled high and waiting; all the village notables were lined up to say good-bye; and Shadrach was missing. I had shut him in my bed-room until we should start, and in the excitement of moving boxes and duffle bags someone had left the door open. With downcast faces a dozen strapping Kurds scoured the land about the house for that one small animal. They even climbed up on the flat roof, peered, Santa-fashion, down the chimney, and emerged with grimy turbans and smudges on their noses. No Shadrach.

Sorrowfully I put on my hat and took my coat from its hook on the wall. Then something wiggled against my arm. The coat came alive. There was Shadrach, scrambling from the pocket and so obviously pleased that I almost suspected him of vanishing on purpose to reserve himself a seat. The Kurds called praises to Allah, beamed sooty smiles and waved. We were on our way to Mosul.

The trip was not without suspense, as there had been heavy rains in the plain and no car had passed between Arbil, the nearest low-land city, and Mosul, to the west, for more than a week. The state of the roads made no difference to the squirrel, however, for he slept peacefully in my sleeve while we ploughed our own way in the muddy fields of barley that lay to either side of the ruts in the regular track. He slept when we crawled through the swollen waters of the Zab in the wake of a wading Arab who, chanting a tuneless song, felt each step of the way ahead of us in the midst of the yellow torrent. Shadrach still slept while we passed vivid blue bee-eaters chasing insects in the sun, and white storks in wayside puddles, each balancing on a single leg and hoping for a frog. It was not until mid-afternoon, in fact, that the squirrel awoke, just as we passed the mounds of ancient Nineveh and saw the minarets of Mosul rise across the Tigris.

It seemed only fitting that Shadrach should visit Nineveh, that other city of the Jews' captivity, since a trip to distant Babylon was out of the question. So the next afternoon he went along while I collected beetles on the mound that covers the palace of Sennacherib, who lived twenty-seven hundred years ago. There were lots of anemones of scarlet and blue and white, daisies too, violet stars whose names I did not know, and long spring grass that waved in the wind. Scores of beetles were holding a field-day in the freshness that followed the rain, and bees, black and gold and shining in the sunlight, came in hundreds to the flowers. In that hour, Nineveh seemed far more alive than sleepy, human-ridden Mosul. Shadrach snooped as he pleased in his harness at the end of a long cord, and once a large black scarab, outraged at the squirrel's prying ways, nipped him deftly on the nose.

The next stage of the trip lay by rail across the northern fringe of the Syrian Desert. A squirrel cage, which had been ordered from the bazaar, failed to arrive, and at the last minute, as I hunted for a substitute, an old coppersmith reached back in his tiny shop and brought out a tin candy box, large and red with a picture—of all things—of the Statue of Liberty on the top. We punched some holes in it and after that, on necessary occasions such as when we changed cars or trains, Shadrach rode unprotestingly inside.

In one way or another, I had gone to a good deal of trouble for Shadrach's sake. Now it was his turn to help me. We had boarded the Orient Express miles to the northeast of Mosul, at the ever-unfinished end of the old "Berlin-to-Baghdad" railway. The squirrel was quiet in his box, while an Arab porter stored suitcases in my compartment before the train started. A railway official squeezed in, asking in bad French for my ticket. It turned out that I did not have the one he wanted. I had pink and green and orange and red tickets. The hotel people had declared I had every ticket I needed. But this man demanded a yellow one. No yellow ticket—no trip to Aleppo. His voice rose. I must leave the train. Now. It was starting time. My porter, glorying in trouble, lifted down a suitcase he had just placed on the rack. I had horrid visions of my boat's sailing from Haifa without me, while I languished on the wrong side of the Great Syrian Desert. The relentless porter picked up another bag and started to push through the corridor, packed with curious travelers and porters and brakemen.

And then something happened. The train gave a warning lurch, a red tin box slipped off the seat, the lid loosened, and a small gray whirlwind leaped up the porter's leg. The man yelped in terror, dropped my bags and, followed by the startled ticket man, burst out into the crowd. Shadrach leaped to my shoulder, we slammed the door and the train started. As we peered through the window, we saw the ticket collector staring blackly at us as he stood, irrevocably grounded, on the platform. Shadrach had done his good deed for that day.

Thereafter, the squirrel's adventures were numerous, but he met each one with unshakable poise. There was the scene in the Aleppo station, when he worked the lid off his box during the five minutes he was left alone on a heap of luggage, and held court, more interested than afraid, to twenty cheering officers of France. There was the morning he explored the elevator shaft in the Beirut hotel, without even smudging his whiskers, although a fat *concierge* ruined both suit and temper climbing after him. And there was the ill-starred night in Haifa when only pistachio nuts were to be found for Shadrach's supper. Not that he did not like pistachios. On the contrary, he liked them so well that (Continued on page 380)

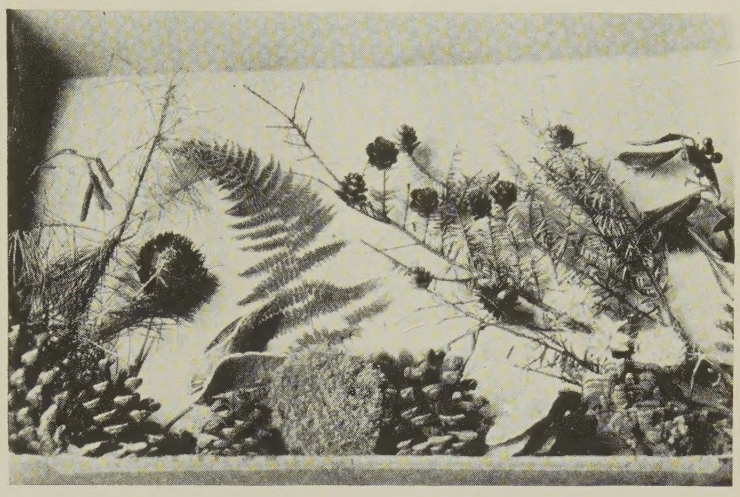
Nature Decorations for Christmas

New ideas for spreading Yuletide cheer

By ANN BRYANT

IF YOU want something a little different, yet at the same time artistic and inexpensive, the following suggestions may fill your need for Christmas decorations.

For the Christmas tree, evergreen cones are attractive, coming in different sizes and shapes, from the long, tapering cones of the white pine to the short, squat cones of the pitch and red pines. The smaller cones of some of the spruces can be used, but those of the larch and hemlock are too small to make a showing. Gild or silver the cones with the liquid mixture that can be procured at the chain stores, or use the powder and mixer that can be bought in larger quantities at hardware stores. Apply with a brush, putting on a second coat if needed.



THE DECEMBER WOODS ARE FULL OF CHRISTMAS DECORATIONS

Evergreen sprays used singly or with conifer cones, evergreen ferns or poinsettias make cheery window displays, as do deep red wintergreen leaves, sumac berries, lichens and fungi. The accompanying illustrations are offered as suggestions for brightening a colorless window pane

Dip some of the cones in a solution of boiled starch, and sprinkle with mica, the so-called artificial snow, that comes in small, inexpensive packages. Other cones may be painted various colors, and if the paint is thin, the cones may be dipped in it and placed on a paper to drain and dry; avoid handling them while they are sticky.

Milkweed pods make good decorations; they should be gathered after the down has flown, when the pods are hard, firm and widely opened. The pods may be gilded, silvered, or painted in contrasting colors according to individual taste. The natural color on the inside is a beautiful golden, or orange, and need not be painted.

The round hanging balls of the buttonbush, hard and compact when ripe, look rich when gilded or silvered, and lose their identity when thus adorned.

Acorns, especially the larger ones, are attractive when colored. These may be used with cup and saucer together, or separately, but if used together, it is suggested that a drop of tube glue be used as they are apt to come apart after they are decorated. If there is no stem on the acorn, push a small tack deep in at the top, before coloring, by which to hang it.

Odds and ends of bright worsteds, used to hang the decorations, add another touch of color, and are, perhaps, the prettiest, but tinsel cord, heavy embroidery silk, and even colored strings may be used, especially for the smaller objects. The long cones of the white pine should be suspended by the stems so they will hang down naturally, while those of the pitch and red pines should hang from their tips to show their beauty. Silk or cord will be best for the acorns.

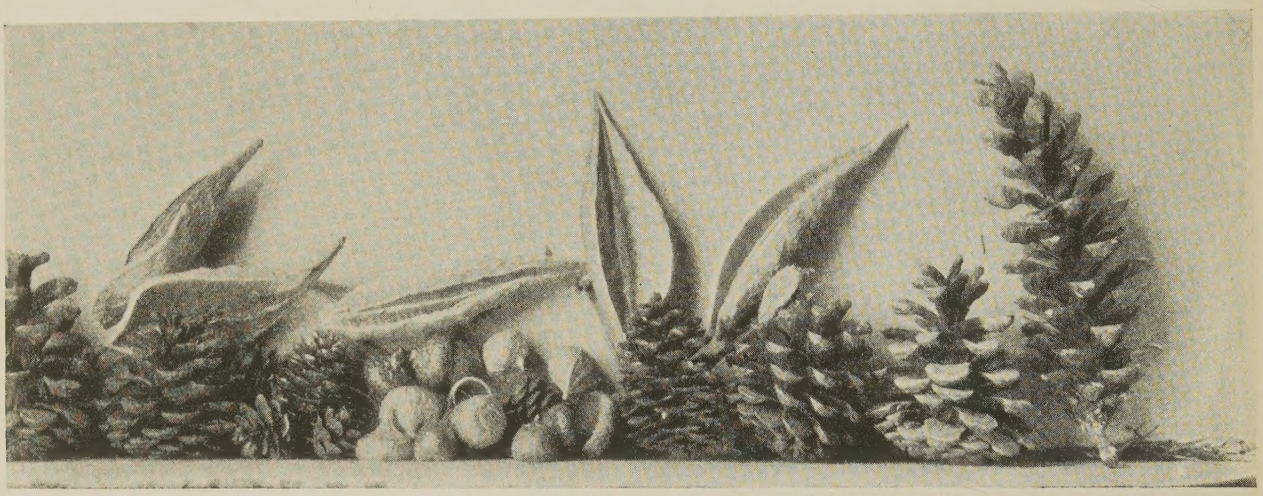
It is a pretty custom to decorate Christmas packages with a bit of Nature—a sprig of holly, or mistletoe. A spray of hemlock with a few of its tiny cones attached is effective, but the needles will drop off if not kept in a cool place. A combination of black alder berries and pine is attractive. Brown cones of the speckled alder may be used in their natural state, or colored, and the drooping unopened catkins of the birches may be used in the same way. Bush clover, found even after the snow falls, also is effective. Dried grasses, either natural or colored, are useful.

Wreaths are the most popular for door decorations, and are not hard to make. Anyone with access to the country has a wide choice of material. Sprays of hemlock make the daintiest wreaths, and the branches

should have the small brown cones on them, if possible, although cones can be wired to any kind of wreath. Spruce, fir, and white pine are also good material for wreaths.

Club mosses, the ground or running pines, American holly, and mountain laurel are used extensively for this purpose, but anyone with the thought of conservation of our wild plant life will find plenty of other material, or will use these sparingly. Berries and straw flowers can be added for color. For window decorations, sprays of evergreen can be used by themselves, or with a cheery poinsettia. Pine cones, a bow of red ribbon or crêpe paper can be added.

Cones serve many purposes. A bag of them done up attractively makes a welcome gift to the city friend who has a fireplace in his home. They can be made into delightful turkeys for Thanksgiving favors, and pretty



candlesticks for Christmas. We have already seen how they can be used on the Christmas tree.

If you have storm windows, why not decorate these with window pictures that will last a long time? The space between the windows provides the setting. For a foundation, use small sprigs of pine, spruce, hemlock, or a short runner of any of the club mosses. These should be used soon after gathering, while the needles are firm and the stems pliant. Get hemlock with cones, if possible, cedar with buds, and juniper with berries.

Open the inside window and stand the specimens against the outer window in the most effective position. An inconspicuous green cord fastened across the base of the window is a help in keeping the specimens in place. Fill in with whatever material you have to make as artistic a picture as possible. Make the windows different, and be sure to allow space for the inside window to close without upsetting the design. Step back frequently to get the effect, and remember that many of the settings will be against a background of snow.

Use as much color as possible. Rosy-red blackberry vines and leaves can be picked late in the fall, adding a rich tone to the decorations. Deep red wintergreen leaves furnish more color, and maple leaves that have been pressed can be used to advantage. Red sumac berries retain their beauty for a long time, and produce a mass of color. Silver-gray bayberries are always beautiful; the red berries of the black alder remain fresh for a long time; and the bittersweet lasts indefinitely. Many of these berries can be washed and used from year to year.

Milkweed pods are attractive, and for variety, leave the bright orange core in some of them. Place cones where they can be seen, and fill any open spaces in the window with alder and birch catkins, or bush clover. Sprays of red sorrel are effective, glowing with color when the sun shines on them. Straw flowers introduce a variety of color, and can be tucked in wherever needed to give a brighter effect. Bits of white birch bark also brighten dark corners.

Mosses, lichens, bracket fungus, stones and shells open up more fields for experiment. You will be surprised and delighted with the effects that can be obtained. Until you have had your windows decorated in this way, you have no idea of the joy it brings. These decorations are especially attractive at night, when the rooms are lighted and darkness has fallen outside.

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Howard J. Shannon, who wrote the excellent book *Life Along the Seashore,* makes his first appearance in these pages next month with *An Ishmael of the Ocean Beach,* the story of a remarkable abandoned cat who was left to shift for herself by homegoing vacationists. In *Prehistoric Weather* we offer one of the last articles written by the late Charles Fitzhugh Talman. Told in typical Talman style, we learn of the interesting methods used by scientists in determining the weather as it was millions of years ago.

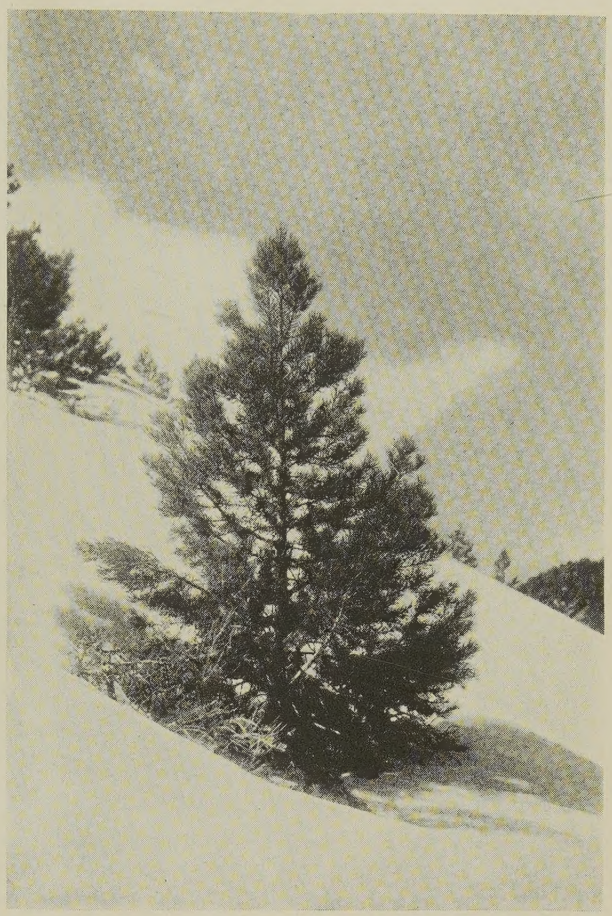
Year-round Christmas Trees

By VERNON BAILEY

Did you ever ride through hundreds of miles of Christmas trees, green all the year around, all sizes and shapes and nicely spaced so each one can grow just as it should grow and have plenty of room around it for an appreciative audience? You can find such a place almost anywhere in New Mexico, Arizona, Utah or Nevada; graceful little nut pines and junipers of several different kinds but all bearing gifts to be presented to those who will come and get them.

Before Christmas time the nut pines will be loaded with little knobby brown cones that pop open and drop their sweet pine nuts, *piñones* the Mexicans call them, for the Indians and squirrels and jays and many other birds and animals to feast upon. In a good year, the Indians gather bushels and bushels of them for their winter food, sending some to market so we may share in the feast. The squirrels and mice hide some away for winter use which makes their Christmas last a long time.

No one but Nature would ever have thought of so useful and bountiful Christmas presents for everybody, and no one else could ever decorate trees at Christmas time with such beautiful crystals of frost and balls of snow as these trees often wear. In summer, these year-around Christmas trees are loaded with flowers, fruit and tender green leaves. When we ride or camp among them we feel their friendliness and often put out our hands to meet their outstretched boughs or smooth their



IN THE LAND OF THE CHRISTMAS TREES

The Nevada nut pine, above, and the Utah juniper are two of the varieties that grow on the mountainous countryside of the West and Southwest

shining leaves and branches. Then in the evening around the campfire, their sweet, piny fragrance fills the air and a few of their leaves under our camp pillows make us dream of friendly trees and happy homes and of kindly old Santa himself.

Then there are the pretty juniper trees, pointed or round or spreading, growing among the nut pines but very different in appearance and fragrance and in the gifts they offer. Generally they are loaded with berries, some kinds sweet and juicy and others dry and sugary; not very palatable to us but a feast for birds and beasts. Foxes and coyotes can always make a meal of them, and jays, cedar birds, robins and many other forms of wildlife eat them when the ground is covered with snow and other kinds of food are hidden. Their pretty blue berries hang on all winter and then lie on the ground all summer, and, like many of the best things in the world, they are free to everyone. That is the real Christmas spirit, but who but Nature would ever have thought of it?

One of the dearest Christmas presents I had last winter was a bunch of juniper leaves in a letter from New Mexico, a letter so sweetly fragrant that I still keep it on my desk where I can pick it up and shut

my eyes and see miles of these trees over the quaint country that I love, and smell the wood smoke from our camp fires, an odor sweeter than the incense from sandalwood or Oriental perfumes.

Another gift of the juniper trees is the wood used for our pencils, fragrant and strong but light and easily sharpened. Smell of a freshly sharpened pencil or put the shavings from the sharpener in the fire if you are not familiar with this delightful odor.

There are many other kinds of beautiful Christmas trees that we bring home to bear our presents and candles and to gather around for the happy Christmas songs. Let us remember also that the wild things have their Christmas trees around which they feast and sing with much of the same joy that we experience, only for them it is more than a one-day Christmas.

Why not make our Christmas last all year and let our bounty extend even to the birds and all our wild neighbors, to let them know that we are their friends? This would be carrying out the true spirit of Christmas.

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An Albino Ground Squirrel

By RALPH E DUNBAR

AN ADULT ALBINO GROUND SQUIRREL

The animal has been kept for experimental purposes since her capture by a South Dakota farmer in 1934

ALBINISM is a condition in which there is a congenital absence of pigment in the hair, eye and skin. Animals so affected are known as albinos. This condition also occurs in flowers of many if not all plants, white flowers frequently being on the same plant among those of the normal color. Albinos have also been known among all races and peoples, neither climate nor race apparently being among its causative factors. However it is extremely rare in many races and frequent in others, as for instance in the Zuni and other tribes of Arizona. It appears sometimes to be a family trait. It occurs rather frequently among mammals, birds, and other lower animals. The most widely accepted theory is that the condition is due to an arrest of the development of the pigment layers in the embryo. This term was first applied by the Portuguese to the white Negroes of West Africa. The writer has personally observed cases of albinism during the past year in the skunk, ground squirrel, ringnecked pheasant, meadowlark, and robin, and in two young girls who were sisters.

The ground squirrel, here shown, is a female *Citellus tridecemlineatus,* more frequently referred to as a "striped ground squirrel," "thirteen-lined ground squirrel," or "leopard squirrel." This animal, as a full-grown adult, was captured by a South Dakota farmer in the spring of 1934. For several months it was confined in a small bird cage, and intermittently displayed in a store window, or housed in a dark basement. Its food consisted predominantly of corn, carrots, and water. Under these cramped conditions the squirrel developed a rather severe case of rickets.

After nearly a year in such confinement, the animal was transferred to larger quarters, opportunity for more exercise was provided, and the diet was supplemented with wheat, barley, oats, green peas, a variety of leafy plants, and alfalfa. Some improvement in her physical condition soon followed but she refused to mate with a healthy male of her own species. Cod liver oil was then supplied and a marked improvement in her posture and activity followed. She has not fully recovered from her rickety condition, but has shown steady and marked improvement in recent months. She is still being retained in captivity for further experimental study.

This race of the thirteen-lined ground squirrel normally ranges over most of the territory east of the Missouri River, covering most of the prairie and great plains regions of the United States and southern Canada. The animals inhabit prairie and brushy areas, but seldom heavy timber or low, wet ground. They are true ground squirrels and spend all but their working hours below the surface in their well-made burrows and dens. For the winter period, they store large quantities of food, often far in excess of normal needs.

Their call notes are a series of long bubbling trills, given as signals of alarm or to convey other information among themselves. Their mating period apparently begins after emergence from hibernation in March or early April. The usual date of birth is rather uncertain as the young do not appear above ground until they are half grown in June or July. They are omnivorous in habit, eating seeds, grains, nuts, berries, green vegetation, numerous insects, and the flesh of such small animals and birds as they can capture or find dead. When numerous, these squirrels often become extremely destructive in grain and corn fields. Their natural enemies are the larger hawks, some owls, foxes, weasels, skunks, ferrets, coyotes and badgers.

Desert Mistletoe and the Birds

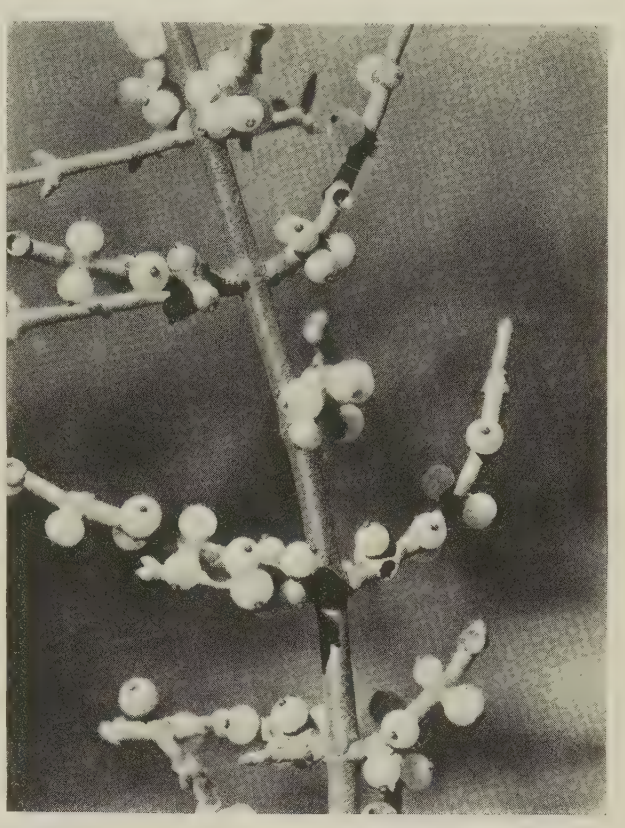
By RAYMOND B. COWLES

WE WERE camped in a grove of ironwood that lay in a vast blue and gold valley of the Colorado Desert. The stunted trees stretched in all directions on the flat, but disappeared toward the higher ground, where creosote-bush, ocotillo and other plants with various root systems and different methods of surviving desert conditions replaced the denser lowland growths. This desert ironwood is *Olneya tesota.*

The desert was at its best. An April sun blazed ardently in a cloudless sky. The wind and dust storms of previous days had vanished, and the desert lay in perfect silence. Above our resting place the spattered shadows of a giant ironwood fell upon a carelessly flung tarpaulin to make a lacy filigree of black on white, but even under this scanty shade the light still was blinding.

It was noon, and during desert noons all life retires for a time. Even the lizards, happy worshippers of sun and warmth, retreat before the hottest noon-time blaze and seek the shade where they seem to sink into a comatose siesta. Lying quietly in the semi-shade of the gnarled and twisted ironwood, we pondered on the many problems that must face each plant and animal whose destiny it is to live in these beautiful but apparently inhospitable deserts. Even the tree above our camp had faced innumerable dangers; drought, wind, dessicating heat, termites and borers. The wood hunter's axe had left its mark, and in old age it faced another and a greater menace.

Scattered here and there along the branches over-head were numerous clusters of bright green twigs. Each cluster represented one parasite, and all the parasites appeared to be thriving better than their host. The word "parasite" generally connotes ugliness, but these were beautiful. Along each bright green twig were scattered hundreds of waxy berries, each fully ripe berry brushed with delicate rose pink. So perfect were the fruits that they suggested hundreds of beautiful pearls set in green mountings; from past experience we had learned that the inconspicuous greenish blossoms that precede the fruit are among the most delicately fragrant on the desert. We had been pondering on the many interesting problems that the desert can present, and here was another, just above us, almost at arm's length, and we did not know even the species of the plant that aroused our curiosity. A book on desert plants soon solved the first problem, that of name; the plant above us scattered on the branches was the desert mistletoe, *Phoradendron californicum.*

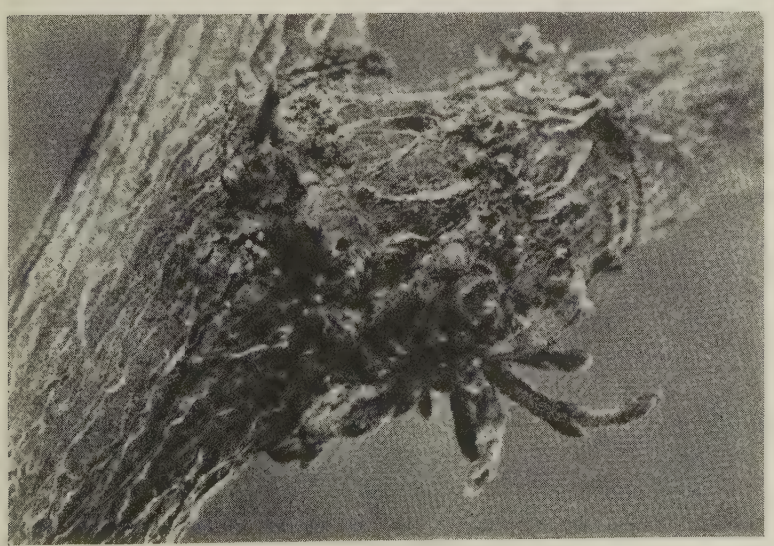


FRUIT OF THE DESERT MISTLETOE

The seeds within these waxy berries bear a sticky covering that fastens them to any object they happen to touch

In spite of the heat and natural laziness, curiosity led to restlessness, and soon, unlike the wise desert animals, we were up and active, prying into the secrets of the parasite.

Another problem to be solved was the mystery of how the mistletoe can sow its seeds on the highest limbs of a tree. And how do these seeds manage to grow in this



YOUNG MISTLETOE PLANT

Here a seed managed to circumvent its host's defenses and became well established on the tree limb

strange "soil" once they have been planted, and what does the threatened host do to protect itself from the invasion?

Once really aroused to the intriguing problems in this connection, we looked about us and saw scattered on almost all the branches, twigs and sticks and even on the ground, thousands of seeds, glistening white and stark on every side. Some were lying singly, some in pairs, others in groups of three or four and sometimes in tens or dozens, like clumped or scattered grains of slightly ribbed and rounded wheat. Most seeds when broadcast by their parents fall bouncing to the ground, float away on parachutes of down, sail away on flattened wings, or cling by barbs to anything they brush against. These seeds had neither flown away, nor floated, nor had they clung by barbs; and as for bouncing, that appeared impossible. On every side of us were seeds that in their fall had touched some twig, leaf or branch, and stuck in passing. Not only had they stuck, barbless, to their perch, but apparently they had then become cemented to their host.

The sticky coat by means of which the seeds had fastened to their victims should by right have been the outer layer of the fruit that bore them. Not all apparent answers are correct, however, and when the ripened berries were dropped upon a twig they bounced without a trace of any stickiness. On looking closer we found that the single seed in every ripened berry was swathed in waxy gum that stuck to fingers, cloth and twigs with equal ardor. Only moisture seemed to discourage this adhesive tendency, and only firm pressure could remove the harmless glossy outer covering.

How could these seeds have been prepared to stick where they could germinate? Real force was needed to remove them from the outer coat and leave them in a condition whereby they could adhere properly. At first glance this question might seem quite baffling, but it was obvious that the seeds could not emerge from shelter of their own accord. Not only was this the case, but had they merely dropped and clung all the seeds would have been confined to spots immediately under their parents. Fifteen minutes' search disclosed the seeds almost everywhere. They clung to twigs and branches yards from any parent growth and seemed to find some way of even moving up above their point of origin. On further search they could be found in piles and mounds on dead and dying twigs, often those that topped the highest living branches. Quite obviously they could only have reached these spots if carried there, and, quite as obviously, only birds could have performed that function.

These simple observations solved the problem of dispersal and closer scrutiny explained why many seeds were grouped in clumps. The desert birds had gorged on ripened fruit, digested away the fleshy outer coverings, then left the sticky coated seeds behind them. Moisture kept the seeds from sticking to the birds, and lack of it facilitated their sticking to a twig.

On deserts, where succulent fruits are scarce, most if not all fruit-eating birds, and many that are normally insectivorous, swarm to the feast spread by the mistletoe. Robins and bluebirds, driven from the higher hills and mountains by inclement weather, Audubon warblers in their winter home, desert quail, thrashers, and many other birds seem to find mistletoe a bountiful provider.

Chief among the birds, and most reliable among them all in spreading the seeds of mistletoe, is the silky flycatcher, *Phainopepla nitens*. All day these perky birds, with jutting crest and livery of black and white, fly back and forth among the ironwoods to feed on the clumps of parasite plants. When they have fed, they perch aloft on the highest twigs and scatter seeds below themselves. Through this habit of selecting perches on the tops of trees they are admirably adapted to the rôle of broadcasting the seeds of their favorite food plant, insuring a supply of food for future generations and a continued existence for the parasite.

MISTLETOE SEEDS
Although many are germinating, they are doomed to die because they fell on a dead stick

Were it not for an explicit preference for bare twigs as favorite perches for the silky flycatchers, these birds would be almost perfect in their rôle. Bare twigs, unfortunately, are usually dead, and often many twigs and branches below such perches are dead also. A common sight, wherever mistletoe and the flycatcher coexist, and one is scarcely ever present without the other, is the accumulated masses of wasted seeds, spotted on the dead or dying branches below a favorite perch.

These piled up masses of dead seeds lead one to speculate on what might happen were the birds to fly from tree to tree scattering all the seeds on living plants. Since mistletoe is prone to kill its host if spread too widely over its branches, it may be well for all—birds, parasite and host—that many of the seeds are wasted in this manner.

Of all the birds that feed so freely on the berries, none is as useful to the mistletoe as the silky flycatcher. Most of the other birds feed freely on the fruits, but in a far more casual fashion; some that sporadically haunt the mistletoe leave the vicinity of susceptible hosts as soon as they have eaten, and scatter their quota of seeds on barren ground.

Although the quail feed freely on these fruits, these birds are of little use to their benefactor, in fact they may be worse than useless, for while they eat they knock quantities of berries to the ground and break or otherwise damage many of the brittle twigs. No other bird

appears to requite its host so poorly, for the quail not only waste fruit and damage the mistletoe, but, when they have fed, resort to the ground so consistently and quickly as to provide little opportunity for seed dispersal in favorable places.

So far the ironwood has seemed a passive host, almost helpless before the cooperation of birds and parasite, and with its only defense the accidental provision of dead twigs for the birds to roost on, and a network of other dead twigs, equally accidental in placement, to collect the falling seeds. Such unwonted helplessness in the face of danger is far from natural, and we suspected that, like other organisms, the ironwood would have some method of defense.

With this idea in mind it was a simple matter to search along living twigs for seeds and newly-started parasites. Within arm's length a dozen seeds were found, each with a rootlet pushing downward to the bark.

The reddish-brown of these rootlets could be seen on almost all the seeds, even those attached to dead, dry twigs. The innocent appearing rootlets were a serious menace to their living support. Once firmly planted in the bark scarcely any method that the plant could employ would remove the clinging tips. To avoid such an ominous penetration one might expect the host to form a pad of hardened bark between its vitals and that gnawing tip, or extrude the gum-forming sap that appears to heal the wound made by other enemies. Either procedure, it may be surmised, could possibly expedite the growth of the parasite rather than deter it, for in either case there would have to be a greater flow of sap right at the point of the rootlet, and sap means life to such a developing seed.

As so often happens, Nature does not work as man expects it to, so in this case no mechanism has developed to ward off the direct attack of the menacing radicle. Instead of a direct resistence, a flow of sap exudes from below the *seed itself,* then hardens as it dries. Below this hardened cap the sap continues to flow until the pressure lifts the capping gum, surmounted by the seed. This process is repeated time and time again until the seed rides high above the twig, the radicle either touching or vainly reaching for a point of contact. Here evidently is a race for life, the downward growing rootlet pushing and reaching for food and safe attachment, the intended victim shouldering the seed away perched on a rising pedestal of hardening sap.

The outcome of the race is seldom varied and the parasitic seeds are usually doomed to lose. As the pedestal grows higher it becomes more brittle in the desert's drying winds and the seed's position is more precarious. Eventually the pinnacle of gum breaks loose next to the bark where healing stems the flow of sap. When the break occurs, the slender radicle or rootlet, to remain attached, must support the weight of seed and lump of gum—and this it can seldom accomplish.

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New Lie Detector Traps Thief

THE Ann Arbor police department caught an early-morning front porch cream thief redhanded but were unable to prove his guilt to the judge until they used their new type lie detector—a bottle of milk.

For three days there had been a mysterious pilfering of cream from homes in the residential area of the city. Taxpayers demanded the culprit be caught. Two patrolmen were assigned to the case, and they performed their work nobly. The thief was caught. He was a black and indignant pet crow.

Handcuffed and covered by the policemen's six-shooters, the crow was marched back to the station house, where he was given the third degree. The crow refused to talk, so it was decided to take the case to the Humane Society. Suddenly, however, the officers hit upon the idea of the lie detector. They admitted it wasn't much of a lie detector; only a bottle of milk with three inches of cream.

The bottle of milk, with the cap intact, was placed in a room with the crow. Leaving the door slightly ajar, the officers began their vigil. Convincing himself that he was alone, the crow hopped up to the milk bottle and with one deft thrust pierced the cap and began to drain off the cream. The squawking he set up when the policemen marched in on him brought no sympathy from the judge, who gave him to the Humane Society for safe keeping.

DETROIT FREE PRESS PHOTOGRAPH

THE CULPRIT CROW CAUGHT IN THE ACT

Uncle Sam's "G-Men" have learned that all gangsters have their one weakness that will betray them. In this case it was a quart of milk

Comet-Hunting for the Amateur Astronomer

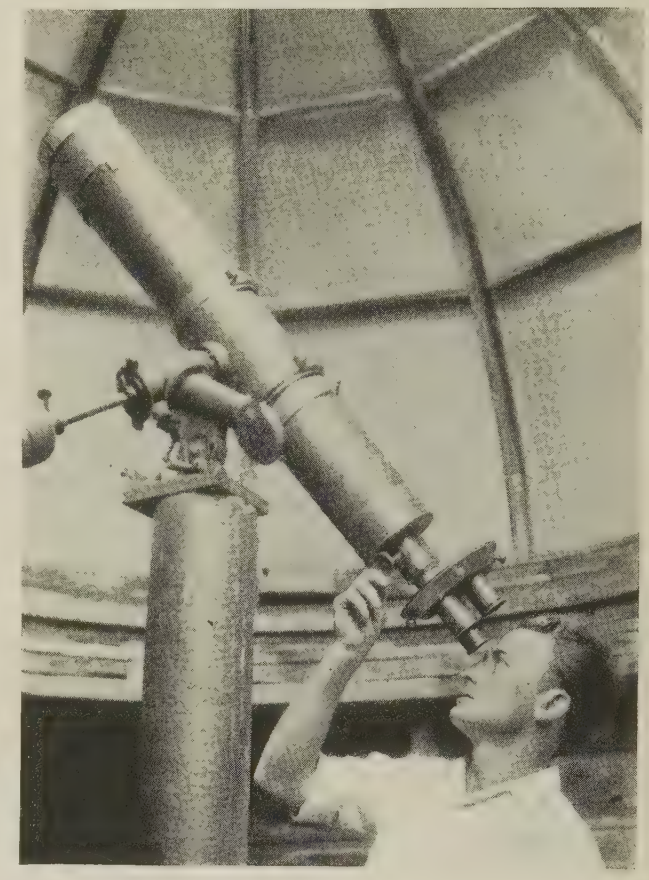
By L. C. PELTIER

Discoverer of "1936-A," the Comet Peltier

TWENTY-FIVE years ago an amateur astronomer was a curiosity. Today, if each amateur in the United States alone were to attempt to train his home-made telescope on a different naked-eye star there would not be half enough such stars to go around.

This tremendous increase in the popularity of the science is the result of several causes, the foremost among these being the fact that the layman who has a more or less natural bent toward science and mechanics has found out that, with a minimum outlay of cash, a fair amount of skill and a large quantity of patience, he can produce a small reflecting telescope that will afford truly inspiring views of the moon, stars and planets. When one sees the jagged mountain formations on the moon or the unique ring system of the planet Saturn for the first time through a really first-class telescope of his own making, he experiences a thrill of utter and complete satisfaction that he will never forget.

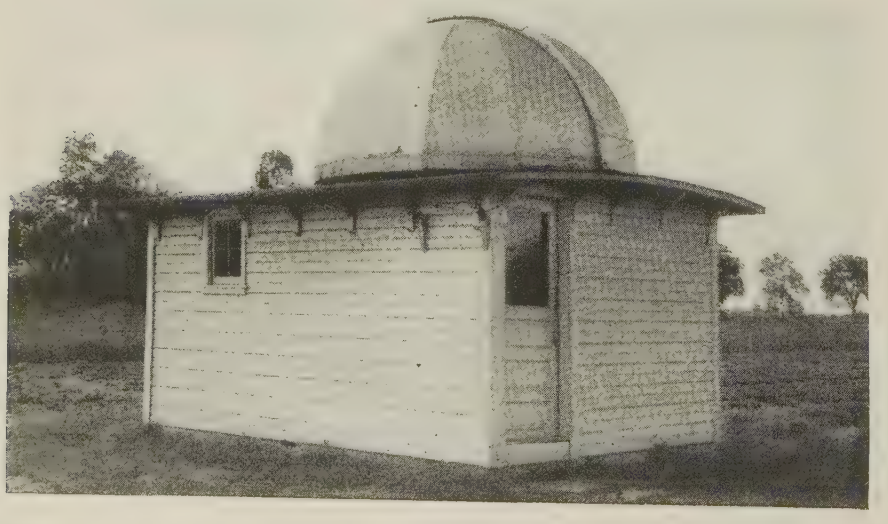
It is fortunate that in this ever-increasing army of telescope enthusiasts there are always some who are not content with merely viewing the different heavenly bodies and learning some of the facts known about them. The unknown has a greater fascination for them than the known. They have an insatiable longing to fathom some of the mysteries of the stars and they recognize the fact that in astronomy science offers the greatest opportunities for the amateur who wants to do original work. They are coming to realize that the amount of diligence and persistence that they possess or cultivate, rather than their meager equipment, is the factor that limits their success.



SEARCHING FOR NEW WORLDS

Here is Mr. Peltier looking through his home-made "comet-seeker" with which he discovered the new heavenly body. Below is an exterior view of his observatory showing the revolving metal dome

Many fields of astronomical activity beckon these amateurs, a large number of whom are variable star enthusiasts. When Mira, the Wonder Star, blazes in the constellation Cetus where only a few weeks before no naked eye star was visible, it is to them more than a star of wonder—it is a challenge—for it has been watched by astronomers, professional and amateur, for more than three hundred years, and science, as yet, has no explanation for the strange behavior of Mira and the many other variable stars of a similar type.



If one has a suitable telescope the systematic search for comets may prove of interest. Not all instruments, however, are well adapted to this class of work, which requires a low magnification and a large field of view. It would appear that the amateur telescope maker, before figuring his mirror, should give careful

consideration to the kind of observing he intends to do. For variable stars and comets the focal length should be kept as short as is consistent with good practice, for this results in a wide, bright field of view that is the *sine qua non* of the comet hunter.

Refractors are somewhat superior to reflectors due to their greater ease of handling and a really ideal instrument for low power work is the one illustrated. It is the type known as a "comet seeker." Its field of view under the lowest power is two degrees in diameter, or in other words, it would accommodate four full moons placed side by side. This extra wide angle makes it possible to sweep over a large area of sky even in a single evening. Where one has a field of, say, less than a degree in diameter, it would probably be advisable to select some particular section of sky such as can be covered in an hour or two and keep it under careful surveillance. At least once each week would be none too often, and of course only the very clear and moonless nights should be chosen. One gradually becomes acquainted with all the nebulous objects in the selected area and will quickly recognize any cometary intruder. Comets are apt to be found in any part of the sky, although many of the noted comet hunters of the past gave particular attention to the region within twenty or thirty degrees of the sun as comets are naturally at their brightest when near that great luminary.

THE COMET PELTIER

Yerkes Observatory scientists were able to obtain this excellent picture of the new comet after the author had informed them where to point their photographic telescopes

One must not think that elaborate equipment is necessary for variable star and comet work. On the contrary, because of their ease of handling, the simplest instruments are often the best, and unnecessary attachments are a hindrance rather than a help to efficient observation. The telescope used by the writer was originally equipped with setting circles and driving clock. However, the circles have never been used, the clock has been removed and, when in actual use, the equatorial mounting is quickly converted into an altazimuth by setting the polar axis parallel with the horizon.

Only the briefest mention may be made here of a few of the many other equally interesting and useful phases of astronomy that the amateur can take up. If he has a camera, no matter what its size, equipped with a fast lens, he might try to secure photos of meteor trains. Good meteor photographs are rare and observatories are anxious to examine and measure them. If he has a means of keeping accurate time he might take up the study of occultations, the purpose being to gain a more nearly perfect knowledge of the moon's orbit by observing the stars that the moon occults or eclipses in her path around the earth. Those who have no instrumental equipment of any kind should keep in mind that they have as good a chance as anyone to be the first to see and report a Nova or New Star provided they have a fairly accurate knowledge of the stars along the Milky Way.

No matter what line of research the amateur elects to follow he should avoid duplicating the work that is already being done at the observatories with their large instruments and highly trained personnel. Plenty of useful and original work has been left for the amateur, who, with his smaller instruments, can do as well or even better than can the professional astronomer.

EREMURUS—DESERT CANDLE

By ANNIE J. TALABERE

MY WONDERING eyes feasted on flower spikes eight to twelve feet tall. Dreamland? No. I had found *Eremurus*—the flower about which I had read but somehow doubted. I touched those glorious blooms and my heart swelled in thankfulness to Nature who gave them to us. I was told that those flower spikes actually grew and developed outside of a greenhouse in an ordinary garden. Tropical as they seemed, they were hardy even in eastern Washington not far from the Canadian line.

In the thrall of such unusual beauty, I ordered a bulb for autumn delivery—and tried not to gulp when told the price. Because of their scarcity and the fact that a blooming-sized bulb must be at least five years old, they are rather expensive.

Now *Eremurus* grows and blooms in my own garden at Walla Walla, and I am as proud of it as it is possible for a garden lover to be of an unusual plant over which everyone exclaims. I have found few who know it, and many are eager for an introduction. My *Eremurus* bewitches me, for when I gaze at it in loving thankfulness, I am transported with it back to Persia, India, or central Africa whence it came.

The root of *Eremurus* is a wide, flat bulb. It reminds me of a great, fat pancake with stubby, irregular fingers extending from its sides. Book descriptions liken it to an octopus, but I cannot, remembering the flower. Because of the extreme brittleness of those plump roots radiating horizontally from the central crown like the spokes of a wheel, great care must be used in planting.

It should be planted in a rather sheltered spot about six inches beneath the surface in rich soil made light and loamy with peat moss and well decayed leaves or manure. *Eremurus* likes a sunny position and moist but well-drained soil. It is desirable to locate it near a border of shrubs, for the flower spikes, like Jack's magic bean stalk, grow "right up" and one cannot overcome a shudder of fear when the wind blows. *Eremurus* blesses us only in the spring and early summer; after that, it is entirely gone, leaving a bare spot lonelier for its having been there.

Quite early in the spring—late April or early May—an enormous asparagus-like point of green shoves aside the protecting mulch that covers the spot where that expensive, dead-seeming brown pancake slept. As this grows, it opens and spreads into a group of long, strap-like leaves somewhat resembling yucca or a palm tuft.

From the center of this group rears a giant pencil of green that leaps toward the sky. One can almost see it move upward, as it actually grows an inch or more each day. This is the beginning of the flower spike.

When the ascending axis has grown about three feet it appears to swell, and out pops a multitude of lovely star-like flowers an inch or so across, crowded closely together. This cylindrical spike of blossoms continues to unfold as the stem lengthens.

A FLOWER SPIKE TALLER THAN A MAN

When full grown *Eremurus* may reach a maximum height of twelve feet

One might compare the blooming spike to a sturdy, erect and inflated delphinium reaching for the sky as straight as a gun barrel. We learn from books that *Eremurus* (Giant Asphodel) is among the most stately of herbaceous perennials, that it belongs to the Lily family, Liliaceae, and is native chiefly to Central Asia. But I like to think of it as the "Desert Candle" for it stands ready to light with a radiance of beauty the bleakest desert of Earth or Life. Like a candle too, it burns entirely out, leaving a thin, dry stalk bristling with many tight little seed pods. When these finally burst even the strap-like leaves have disappeared and nothing remains but the brown earth with its glorious sleeping promise.

The seeds ripen freely and should be planted immediately although they do not send up the tiny, onion-like green sprouts until another spring rolls around. However, one must be patient when planting *Eremurus* seed for at least five years must pass before (Continued on page 380)

A Study In Expressions

By CY LA TOUR

There is no breed properly known as "police dog," but the German shepherd has been trained extensively to aid the police in tracking down criminals. The dog at the right is also a German shepherd showing one of the numerous color variations. Pictured below are the blue-gray and white Siberian husky, used in Alaska as a sled dog, and the St. Bernard, long famous for life-saving work in the snow-swept regions of the Swiss Alps.

The Boston terrier is a man-made breed, his parents being the English bulldog and the English terrier. The foxhound, at the right, is not a modern strain, having been bred in Great Britain for more than 300 years. In this country it dates only from revolutionary times. Foxhounds are used chiefly in the social sport that the name indicates. The picture of the setter was snapped when the dog was in the field on a point. The setter is a breed of gentlemen; they have no fear nor viciousness. The English bulldog is one of the greatest frauds of the canine race. Behind his ferocious look is the gentlest nature possessed by any dog. He is loyal to the last.

The Dobermann pinscher, like the German shepherd, is used in police work. The breed was named after a dog-catcher of Apolda, Germany. At right is a great dane, the national dog of Germany. He has dignity, grace and strength and a powerful and well formed body. Dog fanciers call him the Apollo of dogdom. Everyone should be able to recognize the characteristically long muzzle of the collie, which has the honor of being the best known and oldest member of the domesticated breeds. The last picture is that of one of the most famous English setters in America, "The Country Gentleman," owned by Dr. Thomas A. Mitten of Philadelphia.

Winter Homes

When snow comes and winter winds blow, how fare our small wild creatures? These photographs by L. W. Brownell answer in part this interesting question.

Perhaps the success of the long-tailed wood mouse or white-footed mouse, *Peromyscus leucopus,* depends in part on its ability to take care of itself during the season of cold and food-stress.

First is shown the sturdy nest of a wood-thrush abandoned last summer when the young birds flew away. On this structure the mouse has built a roof of broad leaved grass-blades and strips of bark that sheds the rain, and beneath a cozy nest of fine grasses, fur and feathers. Below this is shown another improvised dwelling, reared on the old nest of a brown thrasher, and containing four baby mice. And in a hollow at the base of an old stump is still another, this time a structure apparently built in its entirety by little white-foot herself.

This meadow mouse of the marsh so far departed from its custom of hugging mother earth as to climb to this low-hung nest of the red-winged blackbird, and there add its own dome-shaped nest of finely woven grass. Here it would be safe should a sudden flood invade its marshy home.

The cottontail rabbit in the northern part of its range usually appropriates the deserted burrow of a woodchuck or skunk for its winter home. In the middle and southern states, however, it disdains such easy couching, and picking a spot more or less sheltered from the elements, and one that affords ready access to a cover that will prove impenetrable to larger enemies, it there crouches during its resting periods. If the intruder promises to pass by its unseen couch, it remains still until the wanderer has passed on.

The muskrat, like its more famous associate, the beaver, builds a house that defies the winter cold, and most of its enemies. From water plants, twigs and sods it rears in the marsh a domed structure that, when mud-plastered and frozen, can be broken into only by the steel tools of man.

Who Cares About the Cold?

This black-eyed Chippewa baby is well equipped for a northern Minnesota winter. The cap is made from skins of the varying hare in its winter coat. In the process, the skins are cut into long continuous strips, and while still soft are twisted into long furry ropes. These soon dry, and are then woven into a sort of fur cloth. The looseness of the weaving allows one to thrust the fingers through the fabric anywhere, but the air it holds makes it nearly cold-proof. A wind beats down the fur and makes it even more cold-resistant. Thus, from material at hand, caps and other pieces of wearing apparel are easily constructed. The Indians of northern Canada formerly made in this way entire suits from the winter coats of the common and wide-ranging hare.

Photograph taken at Burntside Lake, Minnesota, by A. R. Cahn, who takes many unusual photographs.

The Stone Faces of Goblin Gulch

By W. C. MINOR

Stone faces are not new for Nature, the master sculptor, in her most fantastic mood has carved many of these caricatures of mankind and scattered them about in out of the way corners of the earth. New Hampshire's famous "Old Man of the Mountain" is perhaps the best known of all Nature's faces in stone.

Several years ago I became interested in photographing these freak geological formations, and in hunting for new stone faces. Since that time I have gathered a rather large collection of stone face photographs. When one is constantly looking for faces in stone it is really surprising how many one can find, especially in the wind-worn canyons of some of the western states. My most thrilling find in this line was Goblin Gulch in the little known canyon region of western Colorado

just a few miles from the Utah state line.

I first saw Goblin Gulch in the spring of 1932. Since that time I have made several photographic expeditions to the region, but up to this time perhaps not more than a dozen people have visited the place. I was hunting for a bunch of stray goats at the time, and was following up the bed of a small gulch when, rounding a sharp bend, I suddenly came face to face with one of the most magnificent stone faces that I have ever seen. I must admit that I completely forgot the goats I was hunting until I had thoroughly examined this strange place thus accidentally stumbled upon.

Here, in a small gulch not exceed-

ing three hundred yards in length, one can see literally dozens of strange faces and figures, some human, some animal and some resembling nothing on earth except the grotesque gargoyles that architects of other days were fond of using to decorate their buildings.

At the entrance to the gulch stands an odd two-faced figure that I have named Janus, after the legendary two-faced God of the Romans. His picture is the first of our series. Janus was a sentry, or keeper of the gates, and his two faces enabled him to watch in two directions at the same time. In a similar manner Janus of Goblin Gulch keeps one face turned to his ghostly companions while the other looks down the gulch in the opposite direction, as if watching for intruders. Professor Bonehead, at the bottom of the page, regards the scene with a stony frown.

Above is Rubberneck Rufus, whose serpentine neck seems capable of looking in almost any direction. It is quite stationary, however. To his right is pictured the Gnomes' Noses and the Wall of the Gargoyles, one of the strangest formations in Goblin Gulch.

At left is a general view of the Gulch.

The sight of these queer rock formations gives us but a foothold in our attempt to grasp the immensity of Time. Ages have passed since wind and water wore away the softer rock, leaving the more durable in the ghostly shapes here pictured. Goblin Gulch in the moonlight is no place for the timid. The eerie shapes seem to take life, performing a ceremony known as the Dance of the Ghosts. The above picture, taken in broad daylight so as not to frighten our readers, shows two of the dancers just as they stopped at sunrise.

At the right is Balanced Rock. On a column of white sandstone 40 feet in height, Nature has balanced a 20-foot slab of dark-colored rock, like a festive board for the ghosts and gargoyles of Goblin Gulch.

The last picture is a closeup of The Simpleton, shown in the foreground of the picture of the general view of the Gulch. He is staring straight ahead, and bears a striking resemblance to the work of a modernistic sculptor.

Conifer Fruits

Photographs on this and the two succeeding pages by L. W. Brownell.

Pitch pine, *Pinus rigida*, (upper left) is the commonest of our northeastern pines, and the only one in New England that has three leaves in a cluster. The wood is coarse, the bark rough and scaly, and the whole tree ungraceful. Its seeds form a favorite food for the red squirrels, as well as the pine grosbeaks and crossbills on their winter visits from the North.

Virginia pine, *Pinus virginiana*, (upper right.) is a common tree in our eastern states from southern New York and New Jersey to Mississippi and Alabama. Its wood is not valuable, but it is useful in quickly covering abandoned fields. The leaves are short and grow in bunches of two. In general appearance, when growing in groves, it bears a rather close resemblance to the Banksian pine, *Pinus banksiana*, the wide-spread species of the far north, and like it bears its leaves in twos.

White pine, *Pinus strobus*, gave its name to the Pine Tree State, Maine, and bears the floral emblem selected for that state.

Douglas spruce, *Pseudotsuga taxifolia* (upper left) is a western tree resembling in some respects both the spruces and the firs, and which has received a generic name that means "false hemlock." In its native habitat it grows to be 200 feet high, and up to twelve feet in diameter. It lives in the Rocky Mountains from latitude 55° west to the Pacific. It is one of the principal timber trees of the west, and is rather extensively planted in other parts of the country.

It was probably the Dutch who were most active in introducing the Norway spruce, *Picea abies,* in our eastern states, and magnificent specimens, a hundred years old or more, now ornament many an old homestead. (Upper right.)

Black spruce, *Picea mariana,* is one of our most traveled trees, ranging from the northern limit of tree growth, from Labrador across to Alaska, south through the great transcontinental coniferous forest of Canada, and in the United States through Minnesota, Wisconsin, Michigan, and Ohio, and in the Alleghanies to northern Alabama. Spruce gum, so popular before the days of the manufactured product, came mainly from this species. The wood is used for many purposes, and is now one of the main standbys in the making of paper pulp.

The European larch, with its tufts of delicate needles that fall in late autumn after its pleasing seasonal display of golden orange, is a favorite in the United States from the fact that it endures planting farther south than its relative native to America. It is *Larix decidua.*

Red cedar, *Juniperus virginianus,* is a common tree in most of our eastern states. The bluish berries, modified cones, furnish a winter food greatly relished by many birds, and this fact is responsible for its planting in such profusion along fences and in old fields. The wood is easily worked and durable, and the pyramidal beauty of growth makes it a favorite ornamental species.

American hemlock, *Tsuga canadensis,* is a beautiful tree native to our northeastern region from Nova Scotia to Minnesota, and south along the mountains to Alabama. Its fine soft needles, disposed in graceful sprays, and its pleasing habit of growth, make it a universal favorite. It grows to be a large tree but is not very long-lived. The bark was formerly used extensively in tanning. The wood is coarse and splintery, and is, therefore, suitable only for rough work.

THE COCKROACH

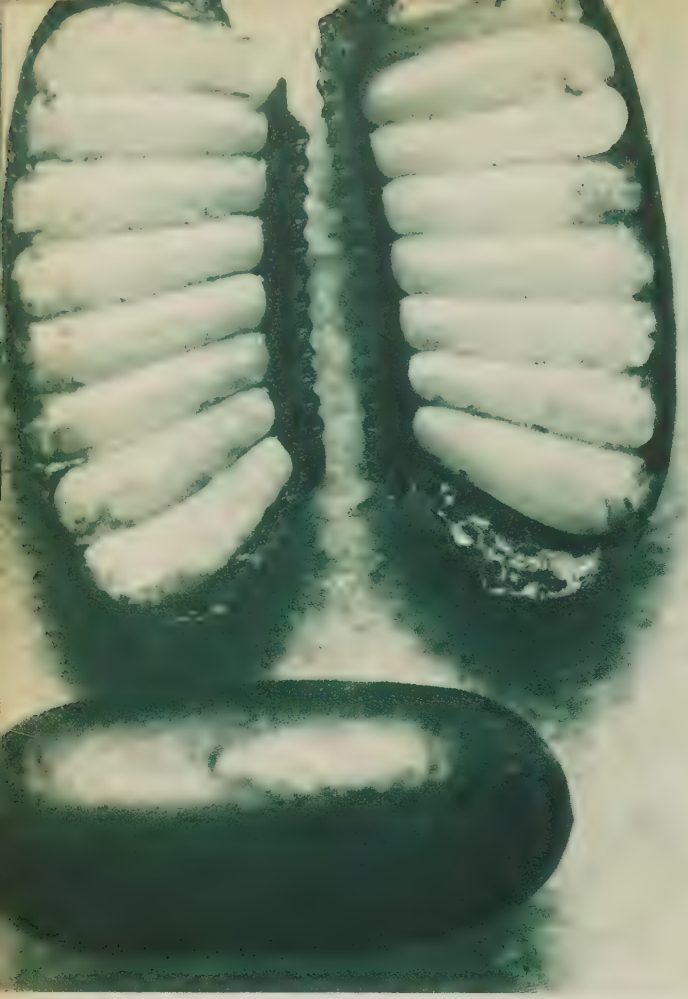
By Lee Passmore

Photographs by the Author

Ages before man appeared on the earth the cockroach family was already well established, for when the fern-like cycads, which flourished in the warm damp climate of the Permian epoch, were depositing their myriad stems and leaves in the muck that was to become coal, these insects left impressions of their bodies that show that they differed little in structure from their present-day descendants. Doubtless when aboriginal man had progressed to the stage where he used caves for dwellings, the cockroach dwelt there with him, for he loves the food that man must have about his home.

Of course, the cockroach does not depend on man alone. This would limit the insect's activities, and in a way hinder his progress. For, while he has retained many of his primitive characteristics, he has been keen to grasp any environmental advantage that has presented itself. Thus there are upwards of 1000 species now recognized by entomologists.

Cockroaches are most numerous in tropical countries, as they prefer warmth and dampness. In their migrations they have utilized the ships of all nations and have thus spread their tribe to most of the temperate regions of the globe. At any rate, they are now common in many parts of the world and are universally despised. They thrive and multiply in the comforts of our homes, eating practically everything that is not too hard for their jaws. Their principal diet is animal and vegetable refuse, and when present in large numbers they are among the worst pests afflicting man. Because of the soft, slippery body they are able to squeeze into exceedingly small crevices and cracks. The rings of the abdomen are capable of great extension and depression, and this adds to their ability to hide in small places. The head is concealed under the front segment of the body so that the mouth parts are pointed backward and the eyes downward. The antennae are long and delicate. Most cockroaches are dark reddish-brown, yellowish, or almost black in color, but some are light green. Although some of the females are wingless, the males usually have two pairs of wings, the outer pair somewhat hard and



the inner membranous. They seldom use their wings, however, usually trusting to their six nimble legs to escape pursuit, but we have some "wild" species that fly as readily as any insect.

The cockroaches are nocturnal in their habits, usually beginning their search for food soon after dark. If a light is flashed on suddenly, the roaches will scurry for cover, leaving behind them a peculiar offensive odor that clings to the places they have infested. Their habit of discharging this ill-smelling secretion, which comes from their mouths, is one of the main reasons why they are so obnoxious.

Besides their partiality to our homes, they inhabit offices and public buildings, and if located in a library will even eat the glue in the bindings of the books. Crumbs that have escaped the housekeeper's broom are choice morsels. They are adept at locating packages of food or cans that have been left open, and will even loosen the paper on the walls by eating the paste beneath it.

It is comparatively easy to control these pests, cleanliness being the first requisite to a roach-free house or building. Keep all crumbs swept up, flour bins covered, and keep the rooms as dry as possible. Sodium fluoride, a substance similar in appearance to sodium chloride, table salt, is a weak poison that can be spread in cracks and corners. The insects, in cleaning the substance from their legs, swallow enough of the poison to cause death. Powdered boracic acid may be used in a similar manner if sodium fluoride is not available.

While the eggs of some species hatch within the mother's body, cockroaches usually lay their eggs and generally in a kind of capsule formed outside the body that is gradually added to, and which protrudes and is dragged about. This capsule is creamy-white at first, but later becomes chocolate-brown. The mother carries this for some time until it has hardened. Meanwhile the delicate eggs are protected by the waterproof case, and are being incubated. When the female is ready to deposit this egg capsule she chooses a spot under a decaying board or some other suitable location. As many as 100 egg cases may be found in one place. The period of incubation depends, to some extent, on the temperature. Several observations disclosed the young emerging after thirty-six days, while in other cases forty-two days were required.

The young roaches require no assistance in making their exit from the egg case. When ready to hatch, the young exude a fluid that loosens the cement that holds the capsule together.

The six little roaches, shown in the last photograph, were hatched in a small glass vial. The author wished to determine if the parent assists her young when they are ready to leave the egg-case. All of them made their exit unassisted, and ten out of the sixteen escaped from the vial by crawling through a hole that had been made in the cork for ventilation purposes. The hole was less than one-sixteenth of an inch in diameter. This photograph was made by flash-light.

Such scenes as this, looking toward Julier Pass from near St. Moritz, in the upper Engadine, explains in large part the lure of Switzerland. The newly-fallen snow, blanketing the landscape from lake shore to the summit of the Albana Mountains, and clinging in fleecy festoons to the drooping branches of the dark conifers, helps to create an atmosphere irresistible to souls alive with the appreciation of Nature's many and varied moods.

In the Canadian Rockies

This scene, showing the Glacier of the Angels, nestled in a ravine flanking Mount Edith Cavell, named in honor of the martyred English nurse, is typical of great areas of Canada's Rocky Mountains. A light snow, which has been blown away from the more exposed parts of the noble mountain, softens the rough fissured surface of the glacier, and the slopes of the great snowfield in the foreground. Here is majestic beauty close at hand.

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

WANTED: ★ ★ MORE TARGETS

For forty-five years W. Lee Chambers has been interested in wildlife, particularly birds. For forty years he has been engaged in the sale of arms and ammunition. For twenty-eight years he has been business manager of the Cooper Ornithological Club and intimately associated with the study and conservation of bird life in southern California. Mr. Chambers knows what he is talking about when he tells about birds and about the instruments used in their destruction. And when he writes under the title "The Hunter in Southern California Versus Wild Animal Life", as he does in the September-October issue of *The Condor*, magazine of the Cooper Club, his words demand attention.

Mr. Chambers describes the "long clouds of ducks and geese on migration" forty years ago. He recalls the day when "the Santa Monica Mountains swarmed with coveys of valley quail", and he remembers a lady of Santa Monica who wore so many hummingbirds on her hat that "she looked like a walking aviary". He recalls the guns of four decades ago that "gave the deer a chance"; the long seasons; the days of no bag limit; of market hunting when ducks brought twenty-five cents and quail five; the rapid increase in the killing efficiency of rifles; the favorite Sunday sport of shooting at burrowing owls until only a few are left; the shooting of pelicans over Salton Sea "to see who could hit the greatest number of this majestic bird".

All these activities Mr. Chambers describes in etching the history back of California's present poverty of wildlife. And these, he points out, are now capped by the "pest drives" and "vermin hunts", adding:

"Here is where the harm comes to the wildlife. Mr. Average Sportsman today buys a nice new, high-powered rifle and is given literature on vermin and pests, or he reads about these in the game and hunting magazines. On his trip out in the country on little-traveled highways he sights a hawk on a telephone wire and, although it is against the law to shoot from a public highway, he sees no one about and takes a bead on the bird, which he generally shoots and leaves where it falls. If he drives off the highway to a sparsely inhabited country, he may spend an hour in one spot, shooting any bird that comes in range of his rifle. When this territory is exhausted he moves a few miles farther and repeats the slaughter. I wonder how long our avian population can stand this destruction. It must be remembered this hunter is only one of approximately 200,000 in California legally entitled to target shoot, and it is seldom that anyone is arrested for this kind of shooting."

Mr. Chambers points out that a new factor in bird destruction "is the new 'hopped up' .22 caliber ammunition." This, together with telescope sights, has boomed the business in .22 rifles, which means that "more targets will have to be found. Birds, animals, road signs, insulators, rocks and anything in sight will be used. The worst drain naturally will fall on our avian friends. The sporting goods dealers know this is a common Sunday sport and encourage it, although they know that thousands of protected birds are killed in this manner."

Quoting Mr. Darling's words about the "conglomerate fraternity" of wild-fowlers, with whom "nothing is barred", Mr. Chambers asserts that "Ding" is utterly right in his statements about the average man with a gun. Furthermore, he declares that "the future of bird life in this territory is doomed unless something is done to stop the tremendous slaughter by target, or practice, shooting.

Large sanctuaries offer the only positive protection, and outside them everything larger than a sparrow is destined for destruction."

These are not the words of a "sentimentalist." They come from a man who sells firearms and shells; who deals with the sporting goods merchant and knows what he is up to. The truth of his indictment cannot be denied. We are frequently accused of being harsh to the sportsman. Is it any wonder when one stops to realize that those sportsmen really entitled to the name still permit their nest to be fouled by such vermin as Mr. Chambers describes?

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MONTANA SLAUGHTERS ANTELOPE

On October 12, the day set aside to commemorate the exploits of Christopher Columbus and the discovery of America, we received a letter from Mrs. John E. Knowles of the Bar N Lazy Y Ranch, Brady, Montana, containing a commentary on what is happening to that America. We immediately wrote to Mrs. Knowles for a postscript to her letter, both of which we now print without comment because we believe no comment is needed. The letter is dated October 5 and reads:

Your articles on conservation deserve a vote of thanks, and we wish to put in a plea for one of our most beautiful and fast disappearing prairie animals, the antelope. We are just now witnessing one of the most heartbreaking slaughters imaginable. Our Game Commission has opened the season on antelope for ten days in Chouteau County, apparently at the request of a few farmers. Our ranch contains 7500 acres, seven hundred of which are in that county. We have a few antelope here and have tried for some years to protect them. We have never complained that they were harming us, and only one or two of the farmers around us approve of this slaughter.

The rest are very indignant. My husband is a deputy game warden, and is doing his best to watch the county line and to keep people from shooting on our land. We have seen some shameful examples of sportsmanship during the last few days. The antelope depends entirely on speed for protection and never hides in the timber. The hunters are running them down with cars. We saw one lone antelope running across a field until he was surrounded by cars and eighteen men shot at him. Four hundred tickets were drawn by lottery for this hunt, and my husband figured there were at least fifty hunters within a few miles and scarcely fifty antelopes. Mr. Bruce Neal, a state game warden, was watching at the same time, and he said that he had never seen anything so pitiful. And these hunters think they are sportsmen! He estimates that at least a third of the antelope are wounded and get away, while the hunters try for more. We are hunting for wounded antelope that may have come on our land, and we are trying to drive any antelope that we can find into the other county where they are safe. Business men in nearby towns have asked us why they weren't given a chance to take up a collection to help us feed the antelope, instead of getting rid of them, and we answer that we weren't consulted about it. It was simply sprung on us suddenly. No one came to count the antelope or ask if they were bothering us. We are doing what we can, but seem to get nowhere. At the end of ten days we are afraid there will be no antelope left. We believe in conservation and have many game birds on our ranch. We are not letting anyone hunt here this year, and we did not allow hunting last year.

As I am writing this I can see one small band of antelope, eight in all, in our hay meadow near the house. If they cross the county line half mile away, they will probably be killed and I cannot stop them. Do you wonder we are putting in a plea for the antelope?

On October 15 Mrs. Knowles wrote us again, inclosing a clipping from a Great Falls, Montana, newspaper describing the antelope slaughter and some of the barbarous methods used by the hunters. In her second letter Mrs. Knowles wrote:

After mailing my first letter we found that the season was to be open sixteen days instead of ten. Until it is closed we cannot estimate how many antelope have been killed. Some have been wounded and left to die. We have counted seven dead antelope within a few miles, and these are what we can see from a car. The natural place for wounded antelopes to hide is in the coulees, and until the hunting is over it is not safe to ride a horse around to look for them.

My husband is busy watching the county line, and has found several hunters in the wrong county trying to drive the antelope into Chouteau County. Hunters are shooting on posted land and we are having trouble keeping our signs up. They take them off the posts while we are somewhere else. Antelope have been coming into our hay meadow by ones and twos and seem to realize that they are safe. We now have twenty-one grazing with our cows, and Heaven help the hunter who crosses the line after them! We are neglecting our own work because we do not want to go into that field just now and scare them out. But we are guarding them closely for we know of cases where hunters are shooting antelope right in farmers' yards.

We had a feeling that NATURE MAGAZINE would take an interest in this matter, and want to thank you for not disappointing us.

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A COSTLY LESSON

We are indebted to W. H. Titus, editor of the *Ellsworth* (*Maine*) *American,* for a clipping that provided him—and now us—with opportunity for editorial comment. The clipping describes the death of the owner of a filling station near Ellsworth, and his assistant, when one of two captive bears revenged its captivity. Commenting editorially on this, Mr. Titus wrote: "The tragedy, regrettable as it is, may have one salutary effect in strengthening and intensifying the campaign against the exhibition of bears at roadside stands. Humane societies have long fought against the keeping of bears and other animals for exhibition, often in unsuitable enclosures and often showing evidence of neglect. The fish and game department has also frowned upon it, but engaged in no active crusade against it. Now the element of danger is tragically presented. With all these interests cooperating, it does seem that the next legislature should be compelled to take action to prohibit this inhumane and dangerous practice. The victims may not have died in vain."

There is, indeed, no justification for these odorous, ill-kept, barbarous private zoos. More often than not, perhaps, they repel rather than attract potential customers. They can and should be prohibited by law in every State.

RODENTS AND CONSERVATION

Control projects provide easy but dubious way to spend money

By CHARLES T. VORHIES

ANTELOPE JACK RABBIT

To remove enough of these rodents to save range for one cow costs $23.68, which in many cases is more than the value of the cow

WE HAVE witnessed, since the advent of the "New Deal", a greatly enhanced interest in wildlife conservation; at least discussion of it by press and public has greatly increased. Naturally an optimist, the writer felt at the outset greatly encouraged. It appeared that our vanishing wildlife in general, the whole fauna, not merely the game species, would experience many and widespread benefits, directly through some activities, and indirectly, through many other agencies, perhaps even more.

In Arizona, where great areas of public domain unfit for grazing constitute a part of the great "hereditary ranges" of certain of our large game species, so forcefully called to the attention of the nation by Mr. Darling, it was felt that surely some provision could be made to insure sanctuary and more adequate protection for those species. It was felt also that in these valueless areas the entire native fauna, even those species that are definitely detrimental in agricultural areas, as well as those of controversial status, could not conflict with agriculture or grazing, because these are non-existent; and that, therefore, the whole faunal complex on those areas might be permitted to live undisturbed by the killers, a valuable tourist attraction, as well as an interesting and valuable field for study.

Alas, for our optimism! Conversation there has been in abundance, but of conservation so precious little that our optimism wanes while our pessimism grows. As plans for passing the public domain over to the states took form under the guidance of the Department of the Interior we listened hopefully for any hint that wildlife would receive consideration. Reports of private conversations with grazing division officials were optimistic—"Oh, yes! The Department would keep wildlife in mind." But in public meetings wildlife was never mentioned; the subject seemed, in fact, to be studiously avoided.

After all, this is no more than we might expect of the Department of the Interior, with its total lack of biological outlook and experience—by which we mean grazing, forestry, and agriculture, as well as game or wildlife management. These facts are well known to many and have been stated emphatically, pointedly, and without fear or favor by men much more important than this writer. Have we made any progress toward a readjustment of departments likely to benefit the languishing wildlife? We have not! Even worse than the *status quo* might yet come to pass—transfer of some of these agencies from the Department of Agriculture to the Department of the Interior, which, as Mr. Darling has so well said, "has more biological deserts to its credit" than any other government agency.

But in introducing the subject of this article we have used the broad field of wildlife, or the whole of the native fauna. Our main purpose, however, is to discuss an unpopular, because often destructive, and certainly much-too-little-considered section of our wildlife complex, the rodents.

Perhaps, to begin with, we can find a common ground of agreement in the following important principle from the report of the Chief of the Bureau of Biological Survey, 1933:

"Interrelationships of wild animals to their natural environment and to man can be properly evaluated only through the application of scientific principles developed by trained biologists. *Research* is therefore essential to the perpetuation of the harmless, interesting, or valuable species, and to *imposing the right degree of restraint* on those that would play havoc with human endeavor if left to increase in numbers unmolested". (Italics mine.)

This is a high-sounding and important policy—would that it were being adhered to! Unfortunately the Survey can more readily find funds for investigation and improvement of the methods of killing wood rats, for example, than resources to finance fundamental research to determine whether wholesale destruction of wood rats is necessary. But before we condemn officials unequivocally for that let us have the fairness to realize that *we* may have a share in the blame for that condition. Unthinking and uninformed enemies of the rodent are legion and vociferous; friends of research, informed and alert to the possible values of the whole biotic complex, are few and comparatively silent. True conservationists should at least exert themselves to secure greatly augmented funds for the research mentioned, if not for reduction of appropriations for destruction.

Unfortunately, for the rodents, "rodent control" is a term to conjure with when there are large sums of money available for the spending. It is a popular idea. It has the

WHERE MONEY HAS BEEN SPENT ON PROJECTS FOR RODENT CONTROL

At the left is a typical scene on the Papago Indian Reservation where cattle have grazed. Below is another scene taken within a hundred yards of the same place but where cattle have been excluded. The control campaign has been conducted on both areas so that the difference in the range represents the effects of cattle only. Rodents have been removed but it is a grave question whether this action will amount to anything

sound of important accomplishment alike to the farmer, the stockman, the forester, the congressman, the relief administrator, the butcher, the baker, the candlestick maker, and any other citizen who either needs work or who pays the bills. One wonders, however, whether the last named gentleman, when at last he turns, as it is believed the poor worm will eventually, may not critically question some of those expenditures. However laudable the meeting of the need for work, there are signs a-plenty that spending of money that cannot be proved to yield results of value somewhat commensurate with the expenditure will finally prove to be a boomerang.

There has been, on some of the erosion projects, a tendency to damn, convict, and sentence the rodents to death on a large scale on areas to be worked for erosion control. The grounds for conviction seem to be general destruction of the new plant cover; although probably it is not thought necessary to state definite reasons. They are rodents; therefore they are destructive; therefore we should kill them. That there could possibly be anything whatsoever in favor of the rodents may be a surprise. Yet surely in an area in which burrowing rodents are so important in the loosening up and aeration of the soil—as in our earthwormless, arid southwest—the little animals deserve to have the possible benefits they confer on the soil carefully balanced against the possible effects of increasing erosion. It may be fairly questioned whether rodents, by and large, are important in causing erosion directly. The pocket gopher in an irrigated region is unquestionably destructive; in non-irrigated bottom-land range possibly beneficial or at least neutral, and in mountain meadows probably beneficial more often than harmful.

Furthermore, the beaver, had it been preserved along the many miles of Arizona water courses where it originally occurred, would have held those great stretches against the destructive forces of erosion, and would be today an asset of far greater worth than its fur ever was. The Santa Cruz River, at Tucson, and for many miles along its course above that point, is now a great gash in the valley floor, with precipitous banks of friable soil several feet in height. These cave in by acres with every flood. (A concrete dam built across its course a few miles above Tucson in the spring of 1935 filled completely to the top with mud in the first summer flood.) Yet within the memory of men now living the Santa Cruz had no channel, its floods spreading out harmlessly over the bottom lands. Back of that time beavers lived along the valley. The same is true of the Little Colorado, and of many a ciénega of southern Arizona. The great San Simon valley, a scene of ruin now, pouring such destructive floods of water, mud, sand, and gravel down upon the irrigated section above Safford that it has had to be included in the great Gila erosion control project, was once a great ciénega with ponds and lush vegetation. Only a pitiful remnant at the very head of that drainage remains today.

By no means is it to be understood that possibly unwise and unwarranted rodent control is an activity only of erosion projects. Even less supportable control operations have been or are being carried out on areas where erosion control is not being attempted, as we shall undertake to show.

To make my meaning clear I must be rather specific. We have in Arizona, as doubtless elsewhere in the "desert", enormous areas of range that are submarginal, or worse. Such an area contiguous to Tucson is the Papago Indian Reservation of 4290 square miles. The carrying capacity ranges from one cow per 100 acres to one

per square mile. Its original capacity was not greatly better. A couple of years ago it was proposed to conduct a rodent control campaign on this Reservation, although the wood rat was doubtless the most abundant rodent. Jack rabbits are not abundant.

Now my co-worker, Dr. Walter P. Taylor of the United States Biological Survey, and I are rather strongly of the opinion that jack rabbits and wood rats represent what we call, for lack of a specific word for it, "animal weeds". We believe them to be an effect, rather than a cause, at least in part. If that view has merit, then to attempt restoration by destroying those animals is precisely like attempting to improve the range by sending out men with hoes to chop the weeds from thousands of square miles. The weeds, as we all know, will reappear so long as overgrazing is continued, and so will rodents, though possibly not so rapidly as the weeds. We do not believe that expenditures of large sums for that kind of work are justified, even though work be needed. The range is not worth it.

THE BANNER-TAILED KANGAROO RAT

Lavish funds for rodent control has resulted in war being declared against this species

But the temptation to obtain and spend an allotment of several thousands of dollars for something that sounds as good as "rodent control" is one that is difficult to resist. And so it was in this case. The issue having been forced by some one who knew little of the actual conditions on such territory, and nothing of the relative values or of the biological situation involved, the money is finally allotted; and the Biological Survey, whether it desires to do so, or whether it believes in it or not, is forced to carry out the project. On one small section of the Reservation at San Xavier Mission, where there is a bit of irrigation agriculture, and in the immediate vicinity of the fields used during summer floods, such a campaign was possibly justifiable. But these areas are only pinpoints on the great reservation. Elsewhere it was, to say the least, of extremely doubtful value. Perhaps rodent control in such territory may be of some use in permitting recovery of the range if and when a drastic reduction of the livestock is made. Without such reduction its value is *nil*.

Possible harmful effects of such a policy which might be suggested are: loss of fur-bearers through drastic reduction of food supply; loss of valuable predators, which will be needed later, since the rodents will not be kept down after the emergency passes; turning of larger predators toward livestock and game, conceivably necessitating a predator control project later. Control breeds more control in a never-ending circle. Certainly many thousands of dollars have been spent on this more than doubtful project. It is time this was stopped.

On a great experimental grazing range near Tucson, Arizona, a rodent and rabbit control project, a so-called "experiment", was planned. The original proposal was for "complete eradication" of *all* rodents, but this was modified when its practical impossibility was pointed out. It finally involved destruction of jack rabbits, cottontail rabbits, Merriam and banner-tailed kangaroo rats, round-tailed ground squirrels, and the incidental destruction of no-one-knows what or how many other forms of animal life.

None of the essential conditions of a scientific experiment were met, and the results, even if measurable in quantity, cannot in fact be calculated.

Nearly $8 per head of livestock on the range was spent on the control work. The cost was 19 cents per acre, which may seem cheap enough until we learn that the cattlemen are paying scarcely 4 cents per acre per year for it. Comparing the cost on the basis of livestock values, we get an interesting result. The estimated cost of killing 12,280 jack rabbits was $3885.92, or about 32 cents per jack rabbit. According to Taylor and Vorhies it takes 74 antelope jack rabbits or 128 California jacks to consume as much valuable forage as one cow. Therefore to remove the antelope jack-rabbit-equivalent of one cow cost $23.68; and to remove the California jack-equivalent of one cow cost $47.36; the livestock was worth possibly $20 to $25 per head. Was it good economy, aside from any other question? Would any cattleman spend that much on his range to get rid of rodents?

Taking off cattle is drastic—for the stockmen. *Uncle Sam pays for rodent control.* But might not the government perhaps take off cattle as cheaply as to kill the rodents; and much more effectively?

What of the effects on wildlife? Apart from the direct effects in rodent reduction, results are for the most part not clearly discernible as yet. The sole scientific result on the animal side is the check on numbers of jack rabbits. Cottontails were not included in the original project, but the control leader found some grass in cottontail stomachs and proceeded to kill off 2500, though the cottontail is already a game animal and no one has yet shown that it does sufficient damage to forage to warrant its wholesale destruction. There seems to be a great dearth of hawks on the Reserve. Whether this is due to the campaign we cannot say. Coyotes seem to be about as plentiful as before. We can form no opinion as to the present status of the fur-bearers. Quail have not notably benefited. One worker familiar with the Reserve says "There is no wildlife there (Continued on page 379)

The Crow as a "Villain"

By ELLSWORTH D. LUMLEY

THE CROW has been so widely publicized during the past three years that the mere mention of the bird brings to the mind of many listeners a picture of a black demon, a destroyer of all song and game birds, a very devil who has increased so prodigiously during the past few years that he not only blights his former territory, but has invaded and ruined the vast breeding grounds in the far north. It now seems to many that the crow has always been severely condemned and that the killing of the crow from the beginning of time has been vigorously carried on by sportsmen.

Before 1933, relatively little was said or written about the crow. He was shot whenever the opportunity was given, but most men would not waste shells on him. The bird was looked upon as a nuisance but not as a menace. Few if any major articles appeared in magazines citing the crow as a cause for the decline in our wildlife. An investigation of the crow and its habits, made by the Biological Survey in 1920, indicated that the bird was of neutral economic value, for it did about as much good as harm. When, in April, 1932, leading sportsmen and conservationists from all over the nation testified on Migratory Waterfowl Shortage before the Special Committee on Conservation of Wild Life Resources of the United States Senate, the crow was scarcely mentioned. All sportsmen and sporting organizations were agreed that the shortage of waterfowl resulted from drought, drainage, and the advancement of civilization. In fact, no predators were emphasized as a cause for the shortage of waterfowl.

Yet on December 29, 1932, just nine months after the hearing in Washington, D. C., there was issued a form letter from the offices of *Field and Stream* stating in part, "If you have been following the reports from Canada you know that practically everyone competent to judge is convinced that the greatest destroyer of North American wildfowl is the crow. Canadian authorities are emphatic in their opinion that our duck shortage of the present day is due more to crows than to droughts and drainage put together." This letter causes one to ask: Who were the Canadian authorities who made this startling discovery? When did they first notice this great damage being done by the crow? Why had they not hinted at their findings at the Senate Hearing just nine months before? Why were these facts not presented to and acted upon by the Canadian and United States Governments? The answer to these questions is not hard to find. During 1930-31-32, seasons had been shortened and bag limits reduced. Fewer men had gone into the field to shoot and those who did hunt shot less. Consequently less ammunition was sold

PHOTOGRAPH BY CORNELIA CLARKE

HE IS CALLED A VILLAIN

And he has provided gun and ammunition manufacturers with an outlet for their products through organized crow shoots

and less advertising was done in sporting magazines. It was necessary for ammunition companies and sporting magazines to get men into the field to shoot at all seasons of the year if profits were to be made.

The crow was picked as a fitting villain upon which to wage year-round war. With the beginning of 1933, major articles began to appear in sporting magazines and up to the present time there has been no let-down. As in the case of all wars, facts are distorted and propaganda is ruthlessly spread against the enemy. Who in his right senses can believe such statements as the following? "Our duck shortage of the present day is due more to crows than to drought and drainage put together[1]"; "The crow is the duck's worst enemy[2]"; "Wise, crafty and cunning, these scoundrels (crows) have taken a far greater toll of our game birds than all the guns in the land[3]"; "The crow destroys more ducks than the combined hunters of Canada and the United States[4]"; "They (crows) flock into the nesting areas of the North like great black clouds, seek out nests of the wildfowl, and fatten prodigiously on duck eggs[5]".

That such propaganda has achieved its purpose is shown by the many crow hunts and crow contests held

[1]Form letter from Field and Stream, December 29, 1932.

[2]"You Can't Duck the Crow Question", Field and Stream, January 1934.

[3]"Fill the Magazine", Field and Stream, September 1935.

[4]"The Greatest Enemy", Field and Stream, April 1934.

[5]"Crow, Brother!", National Sportsman, April 1936.

throughout the country. Every killing device that would get the crow has been used. Types of decoys, blinds, calls, guns, and ammunition best suited to get crows have been given wide publicity. Pictures, both motion and still, of crow hunters and their kill have been spread over the nation. To oppose these killing campaigns almost has been treason and such a person is regarded as a traitor to the cause of conservation.

That the sportsmen took this "conservation war" too seriously and resorted to killing methods not anticipated by the originators of this form of conservation is indicated by more recent articles appearing in sporting magazines. Dynamiting the crows by the thousands and indiscriminate poisoning were not foreseen. Such killings were not only rapid but with little expense. The objective of selling ammunition was lost.

Two methods to put crow killing upon a shooting basis are now being used. One method is to make crow shooting a sport. So we read: "I shoot crows, plenty of them; but I shoot crows for sport[6]"; "——I think a good day's crow shooting is just about as much fun as a good day's duck-shooting[7]"; "Because why? Well, first because it's real sport; good wing-shooting. And second because it's good conservation[8]"; "To anyone who hunts game birds, crow hunting offers a challenge to his sportsmanship as well as to his skill with gun and call.[9]" And more, and more.

The second method is to convince people that the crow is an edible bird. And so we hear of crow dinners being served in Tulsa, Decatur, Wichita, and other cities. Certainly the sportsmen won't dynamite or poison the crows they serve on their own tables.

While it is admitted by all that crows do damage to song and game birds, many people object to the widespread crow propaganda that today is flooding the country. Such propaganda is reminiscent of the war days, when as a nation we aided the ammunition companies in amassing vast fortunes by believing the many reports of enemy atrocities.

The Biological Survey has received rather sharp criticism from the sporting fraternity for not giving financial and moral aid to crow hunts. These Federal officers have refused to believe the reports on crow damage and, with the aid of their trained field men, have attempted to get a true and accurate picture of the relationship between crows and waterfowl. While these reports indicate that damage is done by crows, the government field men have not found such excessive damage as would warrant nation-wide wholesale slaughter of the birds.

If the time, money, and energy expended in crow killing campaigns were spent in projects based upon the findings of science and research, real conservation would be accomplished. It will be necessary for men to think, reason and abide by the findings of wildlife authorities, rather than to accept as true the propaganda spread by selfish concerns if wildlife conservation is to advance.

[6] "Crow-Shooting", Field and Stream, November 1935.
[7] "Crow-Shooting", Field and Stream, November 1935.
[8] "Crow, Brother!", National Sportsman, April 1936.
[9] "How to Bag Those Pesky Crows", Outdoor America, February 1936.

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Sanity from South Dakota

As an example of a viewpoint that seems to have been rather widespread in many sections of the country where duck-hunters live close enough to Nature to realize actual conditions, we reprint this item from the South Dakota *Conservation Digest* for September, issued by the Game and Fish Department at Pierre. It should afford thoughtful introspection to those responsible for the devastating open season now threatening the very existence of many species.

"Keen disappointment," the statement says, "was very much in evidence throughout South Dakota when Federal authorities announced the 1936 waterfowl hunting regulations. This disappointment, strange as it may seem, was not caused by restrictions, but was due to the fact that an open season was declared. Urgent appeals were made to Federal authorities for a closed season on all waterfowl during 1936. These appeals were supported by ardent sportsmen to whom waterfowl hunting is the 'sport of sports,' nearly all of them having firm convictions that unless the season were closed, many important and valuable species of ducks would 'pass out of the picture' forever.

"Just how effective an air-tight closed season would be in the preservation of our waterfowl remnants is a mooted question, but since it is not within the power of Man to regulate those forces of Nature which operate to the advantage or disadvantage of waterfowl, about the only contribution a sportsman can make to the cause is to refrain from shooting.

"The South Dakota regulations are slightly more restrictive than those provided for by Federal authorities, in that hunting on the opening date is not permitted until 12 o'clock noon, and 2 o'clock, instead of 4 o'clock, P. M., is the 'deadline' each day under state regulations. The Commission was prompted to make this latter restriction as a means of simplifying enforcement. Some evening movement of waterfowl is evident during the latter part of the season by 4 P. M. and proves an irresistible temptation to a few wildfowlers to remain in the blind 'just a few minutes longer.'

"Two popular, but at the present time extremely scarce species of ducks, are added to the list of those 'fully protected,' *viz.*, the canvas-back and redhead. This regulation will tax to the utmost the identification ability of duck hunters, in that stragglers of these two varieties not infrequently fly with mixed flocks. A canvas-back in flight may be recognized without serious difficulty, but with the redhead it's different. The law of averages precludes the possibility of too many errors, inasmuch as both species are scarce."

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A compilation made by the Bureau of Biological Survey reveals that nearly six million hunters purchased hunting licenses in 1934. Two years before, witnesses before the special Senate committee investigating the migratory waterfowl shortage testified that about 800,000,000 shells were sold yearly by the major arms manufacturers. This means that each of the 6,000,000 hunters fired an average of 122 shots at our various species of wildlife during the course of the hunting season. And yet, the Podunk Gun Club, at its pre-season banquet, avers that breeding conditions are such that there will be plenty of game for everyone when the new season rolls around. How can wildlife do anything except diminish under a yearly barrage of eight hundred million shells?

WHO KILLED THE CONDORS?

By CARROLL DEWILTON SCOTT

THE STORM-CLOUDS gathered above the condor when the white man began crowding into California in 1850. For two decades thereafter the storm reached sufficient violence to drive the condor from the middle and northwest portions of the state. It then swept down the coast, became a veritable hurricane of destructiveness for two more decades, and when it began to break up at the beginning of the present century, the condor was a candidate for extinction. So much is history. But how did it all happen?

What do the pioneers have to say? Go, for instance, to Hector Angel of Mesa Grande, San Diego County. Cattleman, deer-hunter and homespun naturalist, he is sixty-eight and has lived in the San Diego Mountains since 1880. I visited him last summer.

"Heck, were there many condors here when you came?"

"You could see them in the sky all summer and winter. You could often see a dozen, with the buzzards, around a carcass."

"How many did you ever see at one time?"

"In 1886, in March, after a late snowstorm froze 3000 lambs at Warner's Ranch, I rode horseback through hundreds of condors and thousands of buzzards. There were acres of them. The air was full of them." (Heck really said, "A thousand condors and ten thousand buzzards," but I am allowing for lapse of time and youthful impressions. However, when you consider that Frank Stephens counted twenty-eight around one dead horse in the lower San Joaquin Valley as late as 1894, you may be sure that "Heck" saw something memorable.)

"Did people kill the birds?"

"Now and then. Once I shot one to examine. I saw a cowboy shoot another. One time I found one dead by the roadside. An Indian shot one once to make a feather dancing skirt. But shucks, there were lots of them all through the eighties. Yet in the middle nineties they just faded out. I haven't seen a condor for thirty years except a lone one a few years ago. I can't imagine where all those great birds went."

"Did you ever see a *dead* condor near a carcass?"

"No. I've seen scores of carcasses but I never saw a *dead* condor or buzzard near a carcass."

PHOTOGRAPH BY FINLEY AND BOHLMAN

CALIFORNIA CONDORS

A pitiful few of these great birds are still alive with every indication that unless extreme measures are taken the species is doomed to extinction

One more bit of testimony. This from an Indian, aged 83, who lives at the foot of Palomar Mountain.

"Did you used to see condors in early times?"

"Yes. In the sixties and seventies you could see fifteen, twenty, fifty, in the sky at one time."

"What do you think happened to them?"

"In the eighties they began to scatter. In the nineties they disappeared. I think people scared them away. Once in a while somebody shot one."

I could go on citing interviews. But the stories would sound much the same. In southern California, where condors are seen no more or just casually, they were abundant in the seventies, fairly common in the eighties, disappearing rapidly in the nineties. No, we never saw a poisoned condor. Oh, yes, now and then, one was shot. I wonder what became of the birds?

Practically every writer about the condor lays its dramatic exit to poisoning. Owners of cattle and sheep poisoned carcasses to kill coyotes, bears and cougars and the great birds died.

This tale may have originated with

FINLEY AND BOHLMAN

CONDOR ON THE WING

An easy target for guns and a bird that offers no attraction to the hunter who shoots for skill

CONDOR COUNTRY

A view in Sespe Gorge in the Santa Barbara National Forest, the last stronghold of the California Condor

Bendire because he makes much of it. But he cites no evidence for his statements. Early naturalists often filled the gaps in their knowledge with stories from pioneers and some of the stories were fantastic. But the printed word has more lives than a tomcat. As far as I know, nobody who has repeated the poison story has ever offered a shred of evidence. Since the poison explanation is a theory, the burden of proof is certainly with the theorist.

Biological evidence is against the theory. The condor is a vulture and, presumably, like the turkey vulture, is immune to poisons or can get rid of them by disgorging. It is the habit of condors, as well as buzzards, to linger at the banquet table for hours, even days, either on the ground or in neighboring trees. A cattleman in the Sespe, in the "good old days", once walked among a crowd of gorged condors and almost could have kicked several if he had wished. Mrs. Eugene Percy of Fillmore came upon a group of condors at a carcass, one afternoon a few years ago, that were so full they scurried under the trees, before they could take wing, like a flock of turkeys. Is it not reasonable to suppose that if somebody had ever laid eyes on poisoned condors he would have been sufficiently impressed with the spectacle to leave a record of it?

Facts also are against the theory. Condors melted away between 1870 and 1890 which was the period in southern California when the cattle industry was on the wane. Many of the great cattle ranches were being subdivided into fruit farms. Hundreds of homesteaders took up government land outside the big ranches and raised vines, olives and other fruits with bees and chickens—but not cattle. The steer was being crowded out by the fruit tree. Why should condors be poisoned wholesale when the coast counties were going into the fruit business?

The writer has come to the same conclusion set forth by Dawson in *Birds of California;* namely, that the condor was destroyed by gunfire, supplemented by immoderate collecting. One may, perhaps, forgive the collector's part in the tragedy, but who can justify the purposeless killings? But, justified or not, these two factors were fatal. Dawson makes a scant argument in his arraignment of the American citizen. Here is a fuller one.

First. The condor's disappearance in southern California was coincident with the rapid settlement of California due to the arrival of the transcontinental railroads. Between May, 1869, when the Central Pacific arrived in San Francisco, and 1888 there was one of the most spectacular booms on record. Northern cities grew and hundreds of thousands of people poured into southern California. What gold had done for the north, climate did for the south. And census figures tell nothing of the enormous floating population that came and went.

Who were these people? Home-seekers, health-seekers, adventurers, farmers, speculators, businessmen, sportsmen, prospectors. They bought land and laid out towns and took up homesteads from seacoast to mountain, from Santa Barbara to Coronado. Many of these "boom towns" are still mere names on the map—even their post-offices have been discontinued. But in the late eighties they were crowded with people looking for homes, water, gold, health, adventure. And everywhere the newcomers invaded the immemorial home of the California condor.

What happened to these huge, quiet, unsuspecting, unique birds in the midst of an excited, adventurous, irresponsible crowd of typical Americans? Just one thing—death.

These were the slow-traveling days of the horse and buggy (plenty of time to see everything), pioneer attitudes towards game (boys everywhere collecting birds eggs), and every adult carrying a shotgun, rifle or six-shooter. A stage-driver on the San Diego-Julian road, in 1889, pulled out his pistol and shot a condor as it flew over the stage. The condor was the prey of hunters, tourists, scientists, ranchers (most of whom were curious to see what a condor looked like in hand); sheep-herders, bored with solitude; ruffians with high-powered rifles and low-powered brains; vaqueros (the kind I saw on San Pedro Martir shooting buzzards and ravens); prospectors and surveyors in remote canyons where condors nested and must feed their single nestling for half a

year; oologists (eight eggs taken in one year, 1900, according to W. L. Chambers) ; museum collectors. (Frank Stephens, in San Diego county paid ten dollars for each condor and sold a broken condor's egg for ninety.)

Second. The condor was the finest mark a fool ever shot at. Here was a bird who deserved to meet man at his best. He possessed the majesty of the eagle combined with the gentleness of the swan. There was nothing about him to tempt the avarice of a decent man. He was made for eyes that worship grandeur. The photographs of Finley and Bohlman are testimonial enough. But he met the race on a fool's holiday. His very greatness was his undoing. His size and dignity made a way of distinction for the meanest. Men who dared not meet a grizzly could kill a condor and boast of it the rest of their lives. Conspicuous, trustful, curious, home-loving, the condor's home was easily rifled and left a shambles.

MADE OF CONDOR PLUMES

A feather dancing skirt owned by an Indian near Palomar Mountain, San Diego County, California

Last summer in Sespe Gorge I must have been near a condor's summer home for the birds flew back and forth about me for a long time. Finally two of them sailed over me within a stone's throw. In January of the same year I stood on a ridge in Santa Barbara National Forest, last stronghold of the condor, when an assemblage of fifteen condors (possibly one third of all in existence) passed over me twice. I was in plain sight of them. At least a dozen, both adults and immatures, sailed within a hundred feet of me at different times. You could ride a horse around a fir tree where condors were perched without making them fly. I shuddered to think how easily they could be killed.

Third. The treatment of the condor in Lower California is a counterpart, in miniature, of that accorded him in southern California. Only, below the border, his home was less accessible, there were fewer birds and a mere handful of people. Condors once ranged for two hundred miles south of the International Boundary, down the backbone of the Peninsula. In 1906 they were plentiful in the San Pedro Martir, highest section of the sierra. E. W. Nelson and party saw twelve at the carcass of a donkey and shot two. A. W. Anthony found them numerous in 1895 but reported that no opportunity to shoot a condor for its quills (in which placer miners carried gold dust) was allowed to pass. Forty years later that practice was stopped. There are no more condors.

My son, Robert, and I explored the San Pedro Martir in August, 1935, in a vain search for condors. Only one was seen by resident cattlemen the whole year, that one early in November. The same men told us you could see twenty-five per day in 1915. We talked with two vaqueros who had shot three condors during the last three years. We examined a pile of hawks, ravens and buzzards, shot for fun, near the ranch-house. No game laws were enforced in this country. How could condors escape?

Thus they vanished from the wild, cloud-piercing pinnacles of the San Pedro Martir, stricken down in tragic helplessness by uncouth vaqueros!

After all, is not man running true to form in shifting the blame for the destruction of the condor? Didn't he do the same thing in regard to the passenger pigeon? He loves to find a scapegoat for his misdeeds. And he halfway believes his excuses. The pioneers who slaughtered the pigeons were too close to the tragedy to have perspective. The persons who were killing the condors didn't know what their contemporaries were doing. But now that a generation has passed we can see that the detailed killings of a bird that increases as slowly as a condor made an appalling aggregate.

What of it, says the cynic—the condor couldn't survive anyway? The answer is outside this article. Suffice to say that it has survived in the Santa Barbara Forest region. Biologically it is just a glorified turkey vulture and can subsist where several of them can live—wherever there are deer, cattle or humbler provender—and safety.

And still the crowds are pouring into California. And, alas, the protection afforded the pitiable remnant of the grand and lonely birds in the Santa Barbara Forest is not commensurate with the menace. The condor in the San Diego Zoo was captured with a broken wing; within the decade a dead one was left in a gunny sack at the door of the Natural History Museum. I know what I would do if I had the power—go far beyond what Hornaday urged Californians to do twenty-three years ago, which was, to "raise the fine for molesting a condor to $500 with a long prison-term as an alternative and appoint an exclusive condor warden". Millions of people, millions of dollars to spend, millions of acres of wild land but only a few dozen condors!

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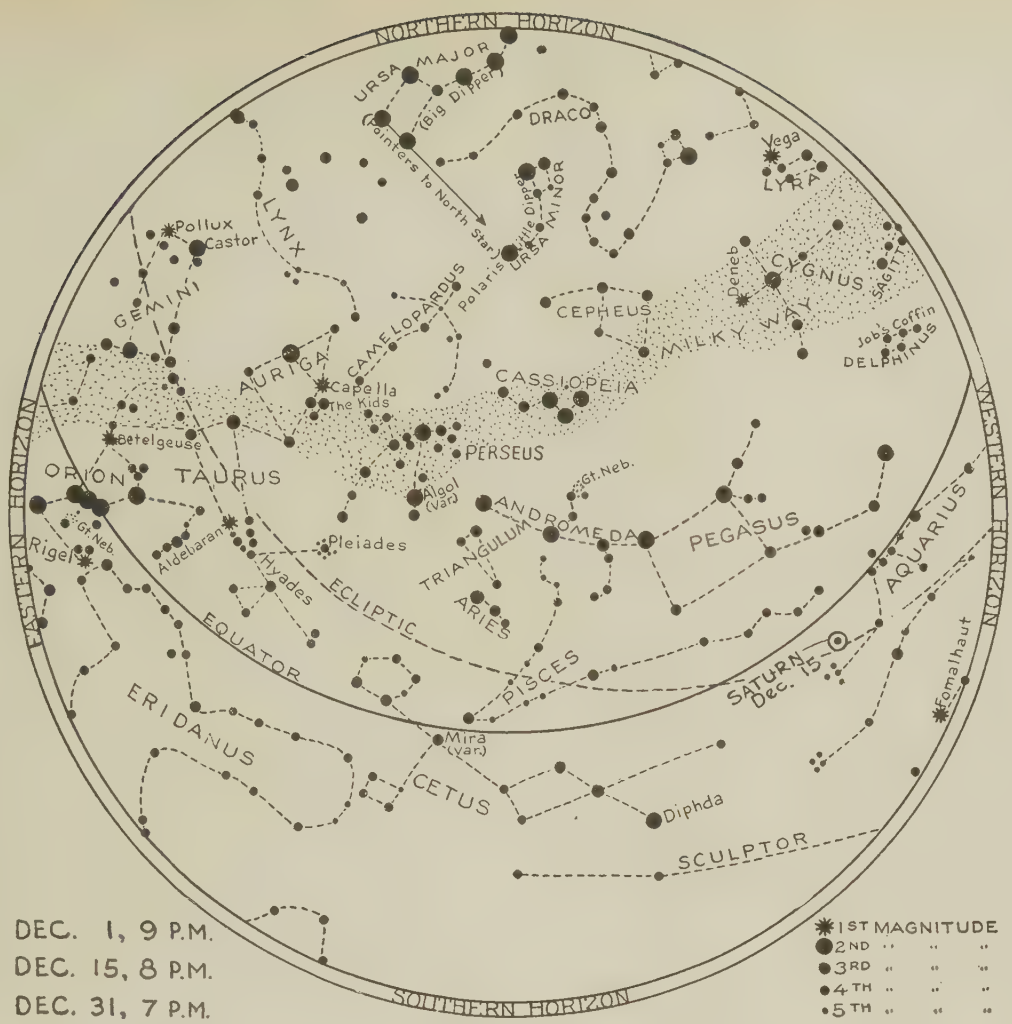
Conservation-minded readers of Nature Magazine who wish to be kept advised of special problems that arise between issues of Nature Magazine may have their names placed on a list to receive special conservation bulletins, information and calls to action. Just write to the Conservation Department, Nature Magazine, Washington, D. C. and ask to be placed on the special conservation list.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Sightseeing on the Moon

By ISABEL M. LEWIS

A DEPTH so great that from within its shadows neither sun nor earth is ever visible, an object so brilliant that it is visible by its own light even when its surroundings are dark, and bright rays of unknown origin that extend in all directions for hundreds of miles from one of the most beautiful craters of the moon like spokes of a wheel, are only a few of the remarkable objects that may be seen on the moon with no greater optical aid than a good field glass. Maps that show the positions of the most prominent features of the lunar surface can be found in a good star atlas and are almost indispensable in identifying the objects that our field glasses or small telescopes reveal.

The two most noted and easily recognized objects on the moon are the craters, or ring-plains, as they are more accurately called, Tycho and Copernicus, with their elaborate system of rays. Tycho is near the south limb of the moon and can be seen to best advantage when the moon is full. It is the most conspicuous object on the moon at that time. Copernicus, which is generally considered to be the most beautiful of all the craters of the moon, is almost exactly equal to Tycho in size. Both are 56 miles in diameter and both are deep depressions, roughly circular in shape, surrounded by lofty mountain walls that rise to heights of two miles or more from their inner floors. The exterior slopes of the walls have a gradual descent to the surrounding regions but the inner slopes are terraced and steep, are broken by many deep ravines and show signs of enormous landslips. Central mountain peaks rise from the floors of both craters to

heights of a mile or more. Copernicus, because of its more favorable position in the northeast quadrant of the moon, isolated from other prominent markings on one of the great lunar maria or "seas", appears to much better advantage than Tycho. It is a magnificent object when the sun is rising or setting upon it and the long shadows cast by its lofty ramparts fall upon its inner slopes. Copernicus is the center of the second largest ray-system on the moon. Unlike those of Tycho its rays are feathery and intricate in appearance. They extend northeast to Aristarchus, the brightest object on the lunar surface, and equally far in all other directions. The systems of bright rays that surround not only Tycho and Copernicus but also other smaller craters are of unknown origin. There are, in addition, small, bright, circular patches from which similar ray systems emanate. It is possible that the rays may be light-reflecting material ejected from the craters at times when they were in eruption, though those who believe in the meteoric origin of the lunar craters see in them splashings of meteoric material at the time of collisions with the surface. It is a strange fact, however, that the rays surrounding Tycho do not come to a focus in the center of the crater but appear to originate in great numbers of small bright craters on the rim.

Aristarchus, which we have referred to as the brightest object on the moon, is a ring-plain 29 miles in diameter located northeast of Copernicus near the east limb of the moon. Its inner terrace and central mountain have been observed to be faintly luminous even when the crater was filled with shadows. Under a high sun, bright rays are seen to radiate from Aristarchus similar to those surrounding Tycho and Copernicus. The glare from these rays is so dazzling at times that it is impossible to see the crater ring itself.

Not far from Aristarchus, near the east limb of the moon, is the darkest object on the moon—aside from the shadows cast by mountains—the floor of Grimaldi, a vast mountain-walled plain about 140 miles in diameter.

The deepest formation on the moon is Newton, a mountain-walled enclosure too close to the south limb of the moon to be viewed to advantage. One peak that rises from its irregular and broken walls is 24,000 feet above the floor. Parts of this floor are always immersed in shadows and it is from within these regions of perpetual shade that sun and earth are never visible.

Not far from Newton on the south limb are the lofty Leibnitz Mountains, the highest on the moon, with peaks rising to heights of 26,000 to 30,000 feet. This mountain range is a magnificent sight when a favorable libration of the moon throws it into relief on the limb. This and other mountain ranges, such as the Doerfel and Rook Mountains on the southeast limb, give to the moon its irregular contour and cause the beautiful phenomenon known as Baily's Beads that occurs at the beginning and end of a total eclipse of the sun. It is due to rays of sunlight falling through the valleys of the mountains.

Another striking feature of the lunar surface is the mountain-walled plain Plato, 60 miles in diameter, which is visible even to the naked eye as a dark spot near the north limb of the moon, diametrically opposite to Tycho. The floor of Plato has probably been more carefully scanned in all its details than any other portion of the moon's surface. Changes in the visibility of the many spots and streaks upon the floor of this crater, as a result of many observations, have been clearly proven. It is certain that the floor of Plato gradually darkens as the altitude of the sun above the horizon increases. The light spots and streaks also vary in visibility independently of the altitude of the sun. The surface is, moreover, obscured at times by mist, or low lying vapors, that are dense enough to blot out details that are ordinarily visible. The floor of Plato is comparatively smooth and contains no central mountain peak. One gets the impression from looking at this formation that some molten mass or lava flow at one time poured into this enclosure filling it nearly to the comparatively shallow rim. Plato lies in the midst of a rough and mountainous region between two maria, or seas, which are vast, comparatively smooth, low-lying areas, dark in comparison to the brilliantly illuminated, crater-pitted regions of the south and southwest portions of the lunar surface. Not far distant from Plato on the west are great lunar mountain ranges known as the Alps, Apennines and Caucasus Mountains. These border the lunar seas that bear a strong resemblance to dried-up ocean beds. Another interesting feature of the lunar topography is the large number of lofty isolated mountain masses rising like monuments from the maria. There are a number of these not far from Plato, on the south and southwest, the most striking of which is Pico, due south of Plato. It rises to a height of over 7,000 feet above the plain and has been likened to an immense obelisk. It is most imposing when, under a low sun, it casts its long shadow upon the plain.

It is not possible to mention the many other interesting types of surface markings that abound on the face of our satellite, but if one explores the moon with a small telescope or examines the wonderful photographs taken with the aid of great telescopes he will discover for himself many other strange and beautiful objects on the surface.

The planet Mercury will be well placed for observation this month about a week before the 29th, the time of its greatest elongation. It will then set about an hour and a half after the sun and be visible in the twilight in the western sky.

Venus is still increasing its distance from the sun in the evening sky and increasing in brightness also. It is now a magnificent object in the west after sunset.

The ruddy planet Mars will soon be coming into the evening sky. It rises shortly after midnight on the 15th. Saturn is in the evening sky in Aquarius. It will be in quadrature with the sun on the 8th and will then set at midnight. Jupiter will be in conjunction with the sun on the 27th and will then pass to the morning sky. On December 21 at 7:27 P.M. E.S.T. the sun will be farthest south of the equator and winter will begin.

Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and Camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor

●

Fireside Cheer on Winter Trails

The quicker it appears, the better

LOOKING BACK DOWN THE SKI TRAIL TO THE WY'EAST CLIMBERS' CABIN, WITH A BIT OF THE CASCADES SHOWING BEYOND

THE hiker or camper with a little experience and lots of confidence invites applause on Nature's stage. His act, usually prolonged beyond human endurance, is the production of a good luncheon fire under wretched climatic conditions. The use of artificial props is contrary to his wilderness woodcraft beliefs. What he forgets is that his suffering audience is entitled to the *full* obligations of leadership.

At high noon only a few all-too-brief hours of daylight remain. The sooner the fire is crackling away, the sooner the leisurely luncheon is a reality. The other extreme of a *slow* fire and a *quick* lunch is not so good. Why potter about for nearly two hours, as some embryo woodsmen do, trying to get a fire going in earnest? The thrill of personal accomplishment against great odds will not be shared by others in the party, if, fifteen minutes after the fireside cheer has *actually* commenced, the leader calmly announces they will have to move on if they wish to get out of the woods before dark. Near mutiny reigns.

Another common case is that of the leader who is a poor executive. When packs are downed at the campsite, nobody receives any instructions as to what to do about the fire. Because every man is a boy at heart, the fire builders outnumber all others. Each fellow has his own theory, be it right or wrong, on how to start a satisfactory fire. He who knows his technique will be sparing of paper, selective of fuel and miserly in stacking it like a wigwam until convinced the ignition process is ensured. Most of the time he will have to combat those who, while his back is turned on some supplementary chore, choke the infant fire with excessive amounts of paper, toss on semi-green sticks and too large logs. What might have been accomplished in fifteen minutes consumes an hour or more, through well-meant but inefficient help.

A good executive assigns several men the detail of bringing in the dead wood, paying marked attention, at first, to the all-important small stuff. A second crew sorts out the fuel in three piles—small, medium and large. Any women in the party break up the small stuff with their hands. The remaining men concentrate on chopping or sawing the big logs for later consumption.

With such perfect coordination, the fireman—who has been chosen for his

WARMING UP DURING A LUNCHEON HALT ON A WINTER'S DAY HIKE

outstanding ability in this direction—soon has members of the party eating the midday meal in solid comfort. If any part of that meal has to be cooked, a separate but small fire or two in the vicinity will do the trick.

Better yet is to plan that blazing fire the night before, in the leader's city home. He cannot predict what kind of a raw deal the Weather Man may have in store for the morrow, so he prepares for the worst. In his pack goes a small bundle of packing case kindling, wrapped in newspapers. If no wood is handy, he fills a small bottle with kerosene. There are also a number of patented fire accelerators on the market. Several are listed in the Forum editor's *Camp Cookery* booklet, copies of which are still available at ten cents each.

Any leader commands the respect of his followers when he can route a winter's day trip through a labyrinth of faintly-defined paths. But that respect turns to genuine admiration when a comfortable luncheon fire is speedily forthcoming.

December Gadget List

A reminder: 20 cents to defray postage brings you, promptly as issued, the supplementary information on these monthly gadget lists for a full year. It saves you writing a dozen letters, and the postage on them.

1. One blade of a stainless steel shears has a serrated edge, sufficiently strong to cut rope and thin wire, and for fixing freshly-caught fish for the frying pan. A colored handle lessens the chance of leaving the shears behind in a temporary camp.

2. A first-aid kit which sells for a quarter and weighs ¼ lb. Contains mercurochrome, bandages, absorbent cotton, gauze bandage and new watershed adhesive. All packed inside a rubberized snap-buttoned carrying case.

3. A combined flashlight and screw driver for night work around camp. Very practical tool by a famous Connecticut firm.

4. A luxury which many campers have to forego is whipped cream in hot chocolate and in desserts. An admirable substitute for whipped cream is a light and fluffy marshmallow whip. The can lid is of the slotted, airtight, easy-to-open-and-close type.

5. Boneless hams, canned, in halves or quarters, weighing from 2 to 4 lbs., are announced by a big Chicago packing house.

6. The floating dial compass has no rival for cross-country going. Forum editor has been tinkering with a new small model sent him by an inventor-manufacturer. An unkind friend said he looked cross-eyed as he consulted the compass clipped to his cap. It has a small periscope which, when properly adjusted, reflects the direction in which you are going. It can also be clipped to the belt or carried in the hand or pocket. Because it has no compensator to neutralize the steel, the compass is ineffective in an automobile.

For additional details of this *December Gadget List,* enclose a stamped addressed envelope with your request to the Forum Editor, or send 20 cents for a year's service.

Brevities

142 delegates and guests attended the annual convention of the Western Federation of Outdoor Clubs. Next convention will have the California Alpine Club as hosts, with Mount Tamalpais Lodge as the gathering place. . . . Strike Mount Waddington off your list of North American virgin peaks. The conquerors were William P. House, of the Yale Mountaineering Club, and Fritz Wiessner of Brooklyn, N. Y. . . . Five Youth Hostels are now servicing sections of the Horse-Shoe Trail for overnighters. They are situated at or near Valley Forge, Pughtown, Giegers Mills, Denver, and Lowville, all in Pennsylvania. Blankets are supplied. Horse-Shoe Trail Club will plan riding and hiking trips for groups that contemplate using the trail. The man to write to is Secretary William N. West, 3rd., 1411 Walnut St., Philadelphia, Pa. . . . At a recent business meeting, Minnehikers of Minneapolis endorsed the September Hiking and Camping Forum proposal that a federation of mid-western clubs be formed. . . . Wooded pastures with fences galore comprise the terrain of the Black Hawk Hiking Club, in the tri-cities of Rock Island and Moline, Ill., and Davenport, Ia. The BHHC has a high regard for the care of such fences, otherwise the friendly farmers would revoke their permits. . . . A new type of stretcher is being placed in the shelters of the mountaineering districts of Scotland, North Wales and Northern England. It has a duralumin tubing frame and weighs, including skids, but 27 lbs. The long handles, which fit inside the frame when not in use, enable the bearers to see their feet when crossing narrow ledges. Inventor is Eustace Thomas, of the Rucksack Club. . . . Green Mountain Club is building two new cabins along the Long Trail of Vermont, in memory of two deceased members—Fred H. Tucker and Charles P. Cooper. . . . Stiffknee is a small knob in the Great Smokies. "No one who has climbed it asks why," says the Smoky Mountains Hiking Club scribe. . . . *The Life Line of the Hiker* is the apt cognomen applied to the monthly schedule of the St. Paul Municipal Hiking Club. . . . 13 hiking trails totaling some 50 miles are provided in the historically interesting and scenically attractive Alleghany State Park, located in western New York. Details and a map of them are inside a mimeographed magazine, *Nature Notes.* It is free to visitors calling at Administration headquarters, Red House, N. Y. As a service to hikers and campers, the N. J. Department of Conservation and Development, Trenton, N. J., has just issued a new set of folders (each with a map) of the state parks and forests. The folders are free.

Let's See You Camping

This is the day of the miniature camera, ideally adapted to camping incidents of the caught-in-the-act kind. Such action photographs, when enlarged to about 4" x 5" or 8" x 10", are just what the Hiking and Camping Forum needs, provided they are clear enough to show the necessary detail when reproduced on this monthly page.

Some subject suggestions: A close-up, as in use, of that camping gadget you have invented. The commissary chief directing campfire operations, or checking over food supplies in the cache, which may be anything from a trailer coach kitchenette to a pile out in the open under a ground sheet. Unconventional snaps of commonplace camping incidents particularly welcome. Any unsuitable photographs will be returned if accompanied by stamps for postage.

Cooked Fruit Quickies

The campers expected uncooked dried fruit for breakfast, as it was their last meal before packing up. They had, however, underestimated the ability of the commissary chief to beat the clock.

The previous evening, while his assistants were busy at dish washing, he had filled a pan with dried fruit and warm water. The next morning, ten to fifteen minutes of boiling the fruit in the self-same water—and the fruit was cooked.

The efficient modern way in which dried fruits are processed makes overnight soaking unnecessary except when morning time is precious, as in the foregoing instance.

The quickest to cook are dried figs and pears, 30-35 minutes. Next in line are dried apricots and peaches, 40 minutes. A good hour is needed for prunes—and that hour is the *actual* boiling time. In all cases, to sweeten fruit to taste, sugar should be added during the last few minutes of cooking.

Ski Outfitting Essentials

Skiing has its own apparel requirements, best met by wearing garments designed expressly for this energetic sport.

While the fabric should not be too heavy, it should blend warmth with water-repellent qualities.

Furthermore, garments should be cut to afford the utmost freedom of the entire body, and particularly the legs and arms.

Care of Leather Footwear

"Should I oil or grease my leather boots directly after I return from a stormy day trip or wait until they have dried out?" queries a Forum enthusiast.

By all means wait. They should dry out in two or three days. This mid-week period will still leave several days for the oil or grease to be thoroughly absorbed, before putting on the boots again the following Saturday or Sunday.

Ship Ahoy!

The ship's galley is no place for the type of cook who must have plenty of room in which to work. Identically the same condition is encountered in the nook, cubbyhole or cupboard which passes for the trailer coach kitchen. These compressed culinary quarters, whether on land or sea, have to be reasonably self-supporting.

The landlubber does not envy his sea cruising friends the task of planning, cooking and serving rough weather meals, for which simple and easy-to-prepare menus are essential. Lest the landlubber knock wood, a trailer cook stove has been known to fail at the crucial moment; while gas has a wicked way of being conspicuous by its absence when the nearest filling station is many miles away! During such disturbing interludes, the trailer coach camper will value the rough weather menus of his sea-faring counterpart.

The Galley Guide is a large pocket-size volume which gives menus, recipes, supplies and lists, beverages, stoves, fuels, galley arrangements, food lists and storage plans. The small cruiser is the author's objective.

Alex W. Moffat has a strong aversion to

homemade mayonnaise dressing. Rather than offer a recipe of his own for it, he quotes one from a feminine, and more qualified authority, because, as he says: "It is trick stuff to make and should only be attempted by professionals with high batting averages." And if the galley chef does insist on experimenting with it, Moffat offers solemn warning that "it is etiquette for the rest of the crew to bind and gag him before any damage is done." So much for that.

The time should soon come when some alert publisher will realize that the trailer coach camper needs a handbook with his specific requirements in mind. Meanwhile this $1.50 book of Kennedy Bros., Inc., New York City, fills the bill.

Trailer Coach Camping Trip

Among Forum readers in the east are a number of trailer coach owners who are partial to week-end camping and hiking trips in back country haunts.

Their problem is to find people of like tastes—those who are willing to rough it a little, explore, on foot, scenic spots, and make overnight camp where there is a semblance of wilderness isolation.

This companionship, if only for an all-too-brief week-end, is often hard to achieve, as so many trailer coach owners have the trunk highway and public campsite complex. Such a countryside has too many urban aspects to be appealing.

Provided there is sufficient interest, the Forum editor would be glad to both organize and participate in such a trip next spring. He knows of a number of ideal back country bases within 125 miles of New York City.

The 1937 trailer coach model will embody many comforts and conveniences which the pioneer manufacturers never dreamed would be realized. Every manufacturer is trying his best to outdo the other, to the user's benefit.

One advantage claimed for a new model is that the road clearance is adjustable for wilderness driving, due to a lower center of gravity.

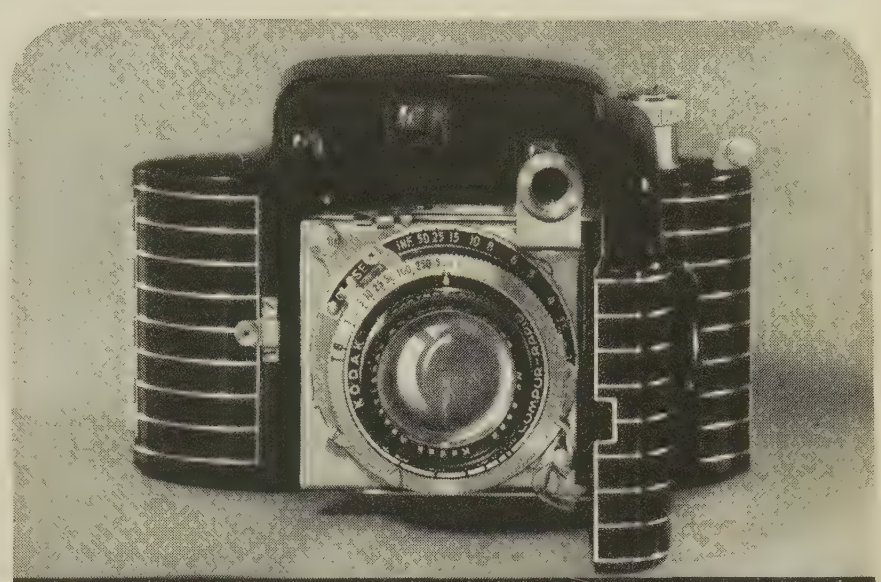
A Sleepy Head Problem

A Forum reader's problem, given in his own language: "Sir Harry Lauder used to sing a song about 'It's nice to get up in the morning, but it's nicer to lie in bed.' That's the way I am every Sunday morning in winter. I know I'll have a peppy day once I make the tremendous effort to throw the blankets aside. I reach over to turn off the alarm—and tuck my head inside the blankets once more. By the time I'm in the frame of mind to get up, it is too late to catch the one and only train to my favorite chunk of the Appalachian Trail."

The Forum editor's solution: The Forum editor was, in his fledgling days, an incurable victim, until he hit upon the idea of having a friend telephone him at a certain early Sunday morning hour. Once up, it was easy to stay that way.

Another plan that this Forum reader might try is going out to his rural destination Saturday afternoon or evening, either camping out or putting up at a hotel. Sunday morning he will be right where he wishes to be for the rest of the day, and even if he does sleep later, he is on the trail no later than if he had arrived by train.

For the Picture-Taking Fan on your Gift List



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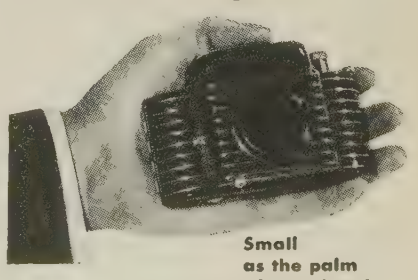

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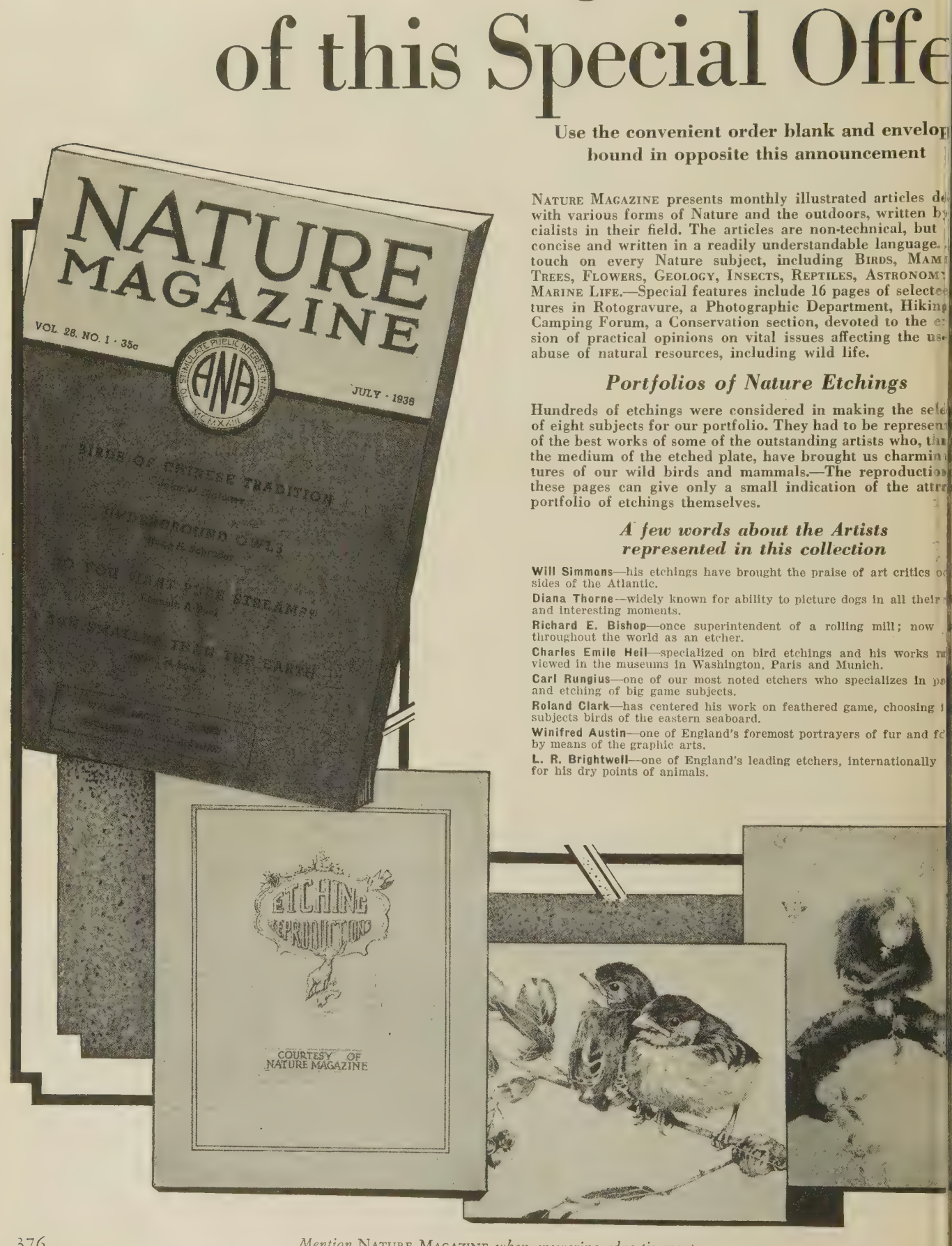

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A few words about the Artists represented in this collection

Will Simmons—his etchings have brought the praise of art critics o sides of the Atlantic.

Diana Thorne—widely known for ability to picture dogs in all their and interesting moments.

Richard E. Bishop—once superintendent of a rolling mill; now throughout the world as an etcher.

Charles Emile Heil—specialized on bird etchings and his works m viewed in the museums in Washington, Paris and Munich.

Carl Rungius—one of our most noted etchers who specializes in p and etching of big game subjects.

Roland Clark—has centered his work on feathered game, choosing subjects birds of the eastern seaboard.

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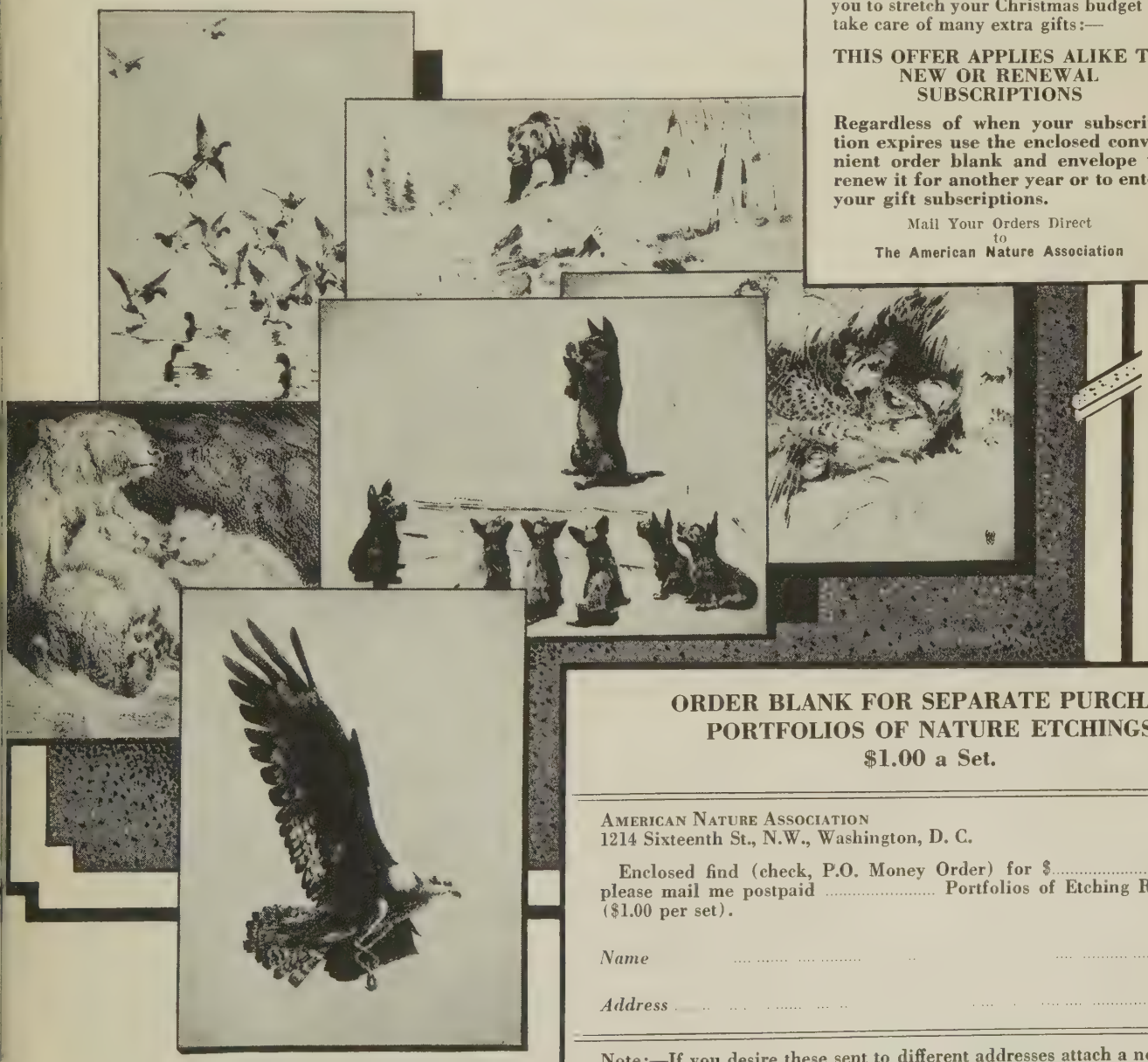

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Nature Magazine in School

A Department of Aid to the Teacher

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science
Washington, D. C., Schools

A Prince of the White Country

This bird is found not only in this country but also has a close relative in Japan. In consequence of its occurrence there and also because it is a strikingly beautiful bird, it is used extensively by the Japanese in their art designs. This bird could be used to advantage in connection with the unit on Japan taught in the lower grades of the elementary school. Due to the habit of the American species of roaming far and wide across the country when its nesting duties are done, pupils in many sections may have the opportunity actually to see this most interesting little bird. Its migration routes could be traced and compared to the journeys taken by the Japanese species. Two of the nicknames of the bird are "Dandy" and "waxwing". Pictures of this bird reveal the aptness of these names. Other interesting points that no doubt endear them to the Japanese as much as to us are the use of the crest to express emotion and the extreme politeness of these birds to each other.

Year-Round Christmas Trees

This delightfully written article, radiating the true spirit of Christmas, teaches natural history, too. In the more thickly populated areas where there may not be enough natural plantings to care for the needs of the creatures of the wild, pupils could make lists of trees and shrubs that would attract birds and other wild friends. They could have a project extending over several school years in which each member of the class planted one or more of the suggested species and noted the kinds of birds or other creatures that it attracted and the season of the year when they came. In the eastern part of the country the list would include, among many others, such trees as dogwood, holly, junipers, cherries, mulberries and such shrubs as haw, sumac and barberry.

At Christmas it is especially appropriate to have a Christmas tree for the birds. An old abandoned Christmas tree serves the purpose, decorated with festoons of popcorn, cranberries, peanuts, acorns and sunflower seed. Several old cocoanut shells filled with suet and a shelf securely fastened to hold a pan of water add to the comfort of the birds. If there are many cats in the neighborhood it is important to surround the tree with a wire mesh fence or some other means of protection. Otherwise the tree may become a lure leading birds to their death. Once they begin feeding the birds, pupils should be impressed with the necessity of continuing it throughout the winter, as the birds become dependent upon the bounty provided.

Desert Mistletoe

In order to determine what adaptations they had in common, it would be interesting to compare the mistletoe found growing in the eastern part of this country with the desert species described in this article. In teaching adaptations, it is sometimes good technique to allow pupils to invent a device for accomplishing a given purpose and then compare their suggestions with the actual facts revealed by the specimen. The desert mistletoe affords several opportunities for this type of instruction that should precede the reading of the article. In the case of seed dissemination, pupils could be told such facts as the distances these seeds traveled without wings or other appendages, that would enable them to take advantage of the wind. Pupils then could suggest probable means of transportation. In the same way they could suggest a means of attachment to the host and some provision that would enable the host to protect itself against this parasitic plant. Afterward they could be given the actual specimens or the article so that they could determine which member of the class has been nearest to the truth in his deductions.

Shadrach

In many of the classes of the elementary school and grades beyond there may be pupils who have either had a pet squirrel or have known someone who had. They would enjoy telling of the antics of these pets before reading the delightfully written article, "Shadrach." It would be interesting to compare the habits of this squirrel from overseas with those of the squirrels native to this country. The use made by all squirrels of the bushy tail could be compared with that made by the red fox of its tail, described in the November article on "The Red Fox in America."

The fact that Shadrach felt so much at home in the gourd would develop the similarity between the gourd and the native home of the squirrel. One of the most essential factors in the successful care of pets is to provide them with comfortable living quarters that resemble as much as possible those in their natural environment. Whenever the opportunity arises, the relation of the squirrel to reforestation should be emphasized. Shadrach's vain attempts to hide his nuts should be noted. Wild squirrels have the habit of covering nuts with earth and then often neglecting to go back to get them. In this way many a forest tree has been planted.

Sightseeing on the Moon

Interest in the moon is manifest as soon as a youngster begins to ask questions. In consequence, some school systems have a unit on the moon at about the fifth grade; others begin even earlier. Pupils find great pleasure in imagining that they are taking a journey to this satellite. They like to deduce conditions. For instance: the height that one could jump on the moon if gravity is one-sixth that of the earth; whether it could rain on the moon or the wind blow there; whether there could be a sound; since there would be no air or water, what color the sky would be, the sunrise and sunset, the shadows; what plants and animals could live there; how hot it gets in the sunshine and how cold at night; whether anyone could visit the moon and how the author of this article found out so much about it.

Rotogravure Section

The pictures in the rotogravure section suggest a lesson on the dog. In the lower grades such ideas could be developed as the following: Dogs are friends of man and were probably the first animals to be tamed by him. Early man was a hunter, the dog was a hunter—the dog could help man. Dogs have great speed in running; the toes are cushioned, acting as shock absorbers, and the nails are used in digging and act as brakes when the speed is being reduced. Dogs have a keen sense of smell; the damp skin on the nose helps to carry the scent. Dogs have strong teeth fitted for grasping and holding prey. Dogs show anger by growling, raising hair on back, barking and dropping tail. Dogs show pleasure by barking, bounding and wagging tail. Dogs have several gaits, walking, running, trotting, bounding and crawling.

A dog show is an exciting event that teachers usually plan to have toward the end of the school day. When the exhibitors are given the privilege of talking about the good points of their pets, practice is given in speaking to an audience and interest in living things is increased. The show can be followed by other activities such as original drawings, collections of dog pictures, stories read and told, trips to the Zoo and the Museum to see the wild relatives of the dog. In this connection the article on the Red Fox in the November issue of Nature Magazine would be useful.

The remarkable pictures showing erosion would illustrate lessons dealing with rocks and soil formation. Some idea of the force of moving water may be obtained from observing the gullies washed in terraces and by visiting a stream to see how the banks have been cut and the stones rounded. If pupils try to sandpaper the rough edges on a freshly dug rock fragment, they become aware of the time element involved in the process of smoothing rocks in water or by the action of wind carrying sand as a tool.

RODENTS AND CONSERVATION

(Continued from page 365)

since the campaign", and that is my own impression.

The value of such campaigns is certainly questionable when there is no accompanying reduction of livestock pressure. "Rodent control" on an unprecedented scale is an open sesame to allotments of emergency funds. Projects are, or recently have been, in operation on most of the Indian reservations in Arizona, parts of which may be justifiable, others not.

I believe, on the other hand, that reduction of livestock is the most important and far-reaching thing that might be done to restore our ranges. A competent range research specialist has recently pointed out that on the Fort Huachuca Military Reservation (Arizona) there is a large area of range clothed in a beautiful sea of grass that during the World War years was eaten into the ground; as a result, erosion had begun. Now, not only has the grass cover been restored but eroded gullies are rapidly healing; and yet nothing more drastic than taking off the livestock was done. Neither rodents nor rabbits prevented recovery, and jack rabbits are not now abundant there.

Our concern, however, is not wholly for the rodent. Perhaps the danger of extinction of any rodent species is remote. But in this rodent killing madness no one seems to think of the possible ill effects on fur-bearers, notwithstanding that the fur industry is greatly alarmed over the decreasing fur supply. To be sure some fur-bearers are rodents—notably beaver and muskrat, but the majority are predators. What pray, are the fur-bearers to eat? We deny them our domestic animals as a food supply, naturally; but we also deny them any share of our game animals, and then we kill off by the hundreds of thousands the rodents and rabbits that have been proved to form a large share of the food of some fur animals. No wonder the fur trade is alarmed. The industry had better realize that the killing madness, which has increased under the New Deal emergency activities, even while we have apparently become greatly conservation-conscious, is largely responsible.

Even social values of our human population are being adversely affected, and in ways that reflect back unfavorably on wildlife conservation. We refer to the effects on some thousands of young men in the Civilian Conservation Corps, whom we are trying on the one hand to educate to an appreciation of wildlife, and on the other, training in wholesale killing! Where control is not thoroughly justified the moral effects of campaigns of slaughter can be only detrimental.

The writer offers here a specific case furnished in personal conversation with a friend close enough to the situation to know whereof he spoke; but if you ask his name, it will have been forgotten. The Grazing Division of the Department of the Interior requested funds for an extensive rodent poisoning campaign on newly established grazing districts, maintaining that there was no chance for range improvement unless the rodents were destroyed. Because it was a CCC project it was referred to the National Park Service, the most completely conservation-minded of any of our government agencies. The Service protested the killing campaign on the grounds that:

1. It is bad policy to train young inexperienced boys in animal killing rather than animal conservation.

2. That the poison is too dangerous to be handled by inexperienced boys.

3. That rodents branded for destruction are important agents in irrigating and aerating the soil.

These sensible contentions were overruled—doubtless at the bottom was the rodent-killing complex plus the desire to "make a showing" of accomplishment. And thus the rodent becomes "the goat". We might say bitter things about the Department of the Interior at this point, were it not that other agencies that should know better are also not guiltless.

The writer has recently learned directly from an authentic source that a certain rodent-killing campaign has been proposed for no better reason than that the officials who have to provide work for a CCC camp "must have something for them to do". Sufficient stray information has previously come to hand to strongly indicate the same reasons in certain other instances, and one can scarcely doubt that some campaigns have been carried out on that basis. In the case definitely known control is not needed, nor is it of economic worth, but is merely "something to do". Training young men to boon-doggle at something valueless is bad enough in all conscience; but when we set them at unnecessary slaughtering of live animals of any kind it is infinitely worse. We then train them simultaneously in boon-doggling and wanton killing, and destroy any hope of a better conservation outlook in the coming generation.

While this article was in preparation a cheering circumstance appeared in the form of resolutions carrying certain recommendations right along the lines of this plea, passed by the Cooper Ornithological Club, and directed to the several bureaus and departments of the Federal Government having charge of these matters.

But this cheerful item was immediately counterbalanced by a new Federal proposal that a means be found to pay farmers for rodent control out of soil conservation funds. If this be done, we may be very sure that abuses will continue, merely cropping out in new forms even harder to counteract.

Two Artistic Books

Some of the most interesting books that come to us for review are products of The Studio Publications, Inc., 381 Fourth Avenue, New York City, and the two most recent ones are no exception. One of these bears the title *Birds and Flowers,* and is a collection of glimpses of old Japan through Japanese color prints. Following introductory text about the birds and flowers of Japan, the author, C. G. Holme, presents, with brief captions, eight color plates to supplement his text. The other book is *Art and Life in New Guinea* by Raymond Firth, and is presented for the intelligent layman interested in art rather than for the anthropological specialist. The author gives us a background of the life of the island and supplements it with profuse illustrations of the results of this life on their art, architecture, sculpture, weapons, musical instruments and objects used for ritualistic purposes. The volume has a fairly specialized interest. It is listed at $3.50.

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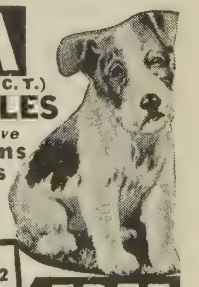

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SHADRACH, THE SQUIRREL FROM KURDISTAN

(Continued from page 334)

for the next three days he scorned all else, although the steamer on which we sailed did not carry pistachios in its galley. When my supply ran out altogether, however, Shadrach stopped sulking soon enough, and philosophically returned to the mundane level of mere walnuts.

Now, at the end of his long trip, he is permanently at home in the New York Zoological Park. Just the other day, on my return from another expedition, I visited him for the first time in his new house. He was asleep at the moment, and I had a chance to admire his huge cage with its conveniently branching tree and snug box. From the keeper, who is his very good friend, I learned that he eats corn and nuts and sunflower seed, while twice a week they give him cod liver oil mixed cunningly with fruit, to keep his hind legs strong. Just then Shadrach awoke, came to the door of the cage and sniffed.

"Shadrach—Hello!" I cried. And because we had made that trip from Kurdistan with only each other's company, I began to feel as reminiscent as a man who meets a fellow angler on a winter's evening. "Do you remember the rats—and the mountains—and that day we—" But Shadrach was not paying much attention; he had thrust his forefeet through the bars and was pawing frantically at my handbag. From its depths he had caught the delectable scent of pistachios.

EREMURUS—DESERT CANDLE

(Continued from page 344)

the seedlings grow strong enough to produce the flower spike that is one's reward.

Besides my unusually tall, glowing pink *Eremurus robustus,* which I have found hardy enough to withstand zero winter weather, there are several distinct varieties. *Eremurus bungei* produces clear yellow flowers on spikes four to six feet tall; *robustus elwesianus* gives huge spikes set thickly with deep pink flowers; *shelfordi*—a hybrid—has a coppery yellow bloom, the outside of which is a reddish bronze; *himalaicus,* the snow candle, offers a six to eight foot flower spike covered with fine little drops, white as falling snow. There is *tubergeni,* another hybrid between *himalaicus* and *bungei,* with pale yellow flowers that appear the earliest of the yellows; *warei,* which produces reddish-bronze flowers on spikes six to eight feet tall; *himrob,* pale pink; and *olgae,* which resembles *bungei* in all save its color: white, red-tinted.

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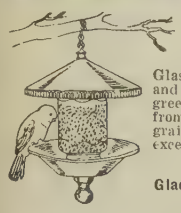

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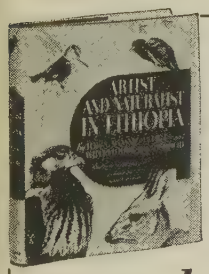

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INDEX TO AUTHORS IN VOLUME 28

Aaron, S. F., 14, 147-148, 216.
Ambler, L. B., Jr., 239-240.
Bailey, V., 269-272, 317, 337-338.
Bell, H. S., 77-79.
Blackford, J. L., 329-331.
Brooks, S. T., 19-20, 98.
Brown, S., 2-3, 55, 66-69, 130-132, 194-196, 258-260.
Bryant, Ann, 335-336.
Charny, Gertrude, 62.
Churchill, D. R., 238.
Collins, Lois, 211, 275.
Cooper, D. G., 306-308.
Corrington, J. D., 21-22, 275-277.
Cowan, Genevra, 12.
Cowles, R. B., 339-341.
Cramer, W. S., 18.
Crane, Jocelyn, 332-334.
Crockett, H. L., and Ruth, 215.
Dahnke, Lillian, 243-244.
Deans, E. V., Jr., 13-14.
Deck, R. S., 268.
Dench, E. A., 58, 60, 122, 124, 186, 188, 189, 250, 252, 253, 311, 315, 316, 373.
Dunbar, R. E., 338.
DuPuy, W. A., 142.
Edge, Rosalie, 305.
Ewer, S. J., 149-152.
Fenton, C. L., 214-215.
Finley, W. L., 107-108, 299-303, and Irene, 171-173.
Fisher, Eva H., 118-119.
Hausman, L. A., 212-213.
Haweis, S., 106, 145-146.
Hope, J. G., 85-86.
Howard, J. W., 143-144.
Howes, P. G., 17, 140-142.
Hulbert, L. Claire, 24.
Hummel, E. C., 23-24.
Hussey, Bernice H., 126.
Johnson, N. C., 73-76.
Jordan, Marie-Anne, 80-82.
Laing, Edith M., 76, 146, 204, 280.
Lester, A., 251.
Lewis, Isabel M., 49-50, 115-116, 180-182, 245-246, 309-310, 371.
Lincoln, R. P., 241-242.
Lumley, E. D., 109-110, 235-236, 366-367.
Maloney, J. W., 9-12.
Mendall, H. L., 175-177.
Musgrave, Ethel W., 248.
Nelson, R., 52.
Oliver, W. F., 209-210.
Pack, A. N., 41, 42, 105-106, 169, 170, 174, 177, 178, 179, 233-234, 297-298, 304.
Palmer, Katherine V. W., 273-274.
Parker, Jane A., 51-52, 117-118, 183-184.
Passmore, L., 90-94, 226-228.
Paul, M. E., 244.
Peabody, P. B., 210.
Pell, S. M., 103-104.
Peltier, L. C., 342-344.
Perkins, Anne E., 87-88.
Preble, E. A., 47, 64.
Reid, K. A., 43-46.
Rhodes, J. D., 88.
Rotmans, W., 223-225.
Rutledge, A., 137-139.
Sarett, L., 82
Schroder, H. H., 15-17, 148, 277.
Scott, C. D., 368-370.
Scott, Esther, 56, 120, 185, 249, 314, 378.
Scribner, F. L., 22.
Smith, W. F., 237-238.
Squire, Lorene, 201-204.
Stanford, E. E., 205-207.
Talabere, Annie J., 344.
Talman, C. F., 229-231, 281-282.
Thorne, Diana, 265-267.
Thorpe, Heather G., 111-112.
Vorhies, C. T., 363-365.
Walker, L. W., 20.
Walker, R. S., 211.
Weed, C. M., 119, 184.
Weed, T., 83-84.
Westwood, R. W., 247-248.
Wheat, Grace, 207.
White, W. W., 308.
Wilson, E. W., 152.
Wuensch, B., 208.
Wynd, F. L., 278-280.
Zahniser, H., 7, 71, 127, 135, 199, 263, 327.

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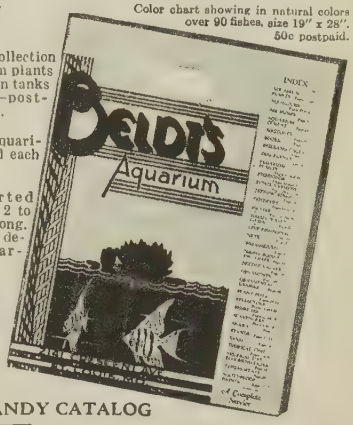

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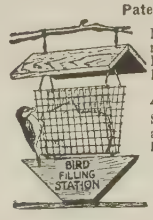

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INDEX TO NATURE MAGAZINE

July-December, 1936

(*Gen.* indicates a general article; *fig.* a photograph or drawing; *rev.*, a review.)

ASTRONOMY

Asteroid, Amor, 115, 116.
  Anteros, 115, 116.
  Eros, 116.
Astronomy, amateur, 342-343 (gen., fig.).
Astronomy for Layman, 69 (rev.).
Comet hunting, 342-343 (gen., fig.).
Comet, Kaho-Kosik, 246.
  Peltier, 246, 343 (fig.).
Eclipse, solar, 180, 181, 182.
Evening skies, July, 49-50; August, 115-116; September, 180-182; October, 245-246; November, 309-310; December, 371-372.
Jupiter, 309, 310.
Leonids, 310.
Meteor, 116.
Moon, harvest, 245, 246.
  hunter's, 245, 246.
  mountains on, 371-372.
  sightseeing on, 371-372.
Moon-bow, 4.
Perseids, 116, 310.
Saturn, 310.
Stars, white dwarf, 49, 50.
Telescope, 342 (fig.).
Venus, 309, 310.

BIRDS

Apteryx, 146 (gen., fig.).
Auk, razor-billed, 87.
Avocet, 172.
  American, 26 (fig.).
Bee-eater, blue, 334.
Birds, Dominican, 145-146 (gen., fig.).
Birds Chinese tradition, 9-12 (gen., fig.).
Birds on postage stamps, 76 (gen., fig.), 146 (gen., fig.), 280 (gen., fig.).
Birds roost, where, 147-148 (gen., fig.).
Birds, San Juan Islands, 235-236 (gen., fig.).
Birds, Southern Michigan, 190 (rev.).
Bittern, 104.
  American, 172.
Blackbird, 238.
  red-winged, 104, 203, 349 (nest, fig.).
Bluebird, 147, 340.
Book of British Birds, 63 (rev.).
Brant, Atlantic, 233.
  white, 201, 202.
Buzzard, 368.
Canary, 62 (gen.), 306, 308.
Caracara, Audubon's, 15.
Cardinal, 174, 192, 196, 197.
Cassowary, 146.
Catbird, 148, 268.
Chat, yellow-breasted, 268 (gen., fig.).
Chen hyperboreus, 201.
Cock, 10.
Condor, California, 368-370 (gen., fig.).
Coot, 172.
Cormorant, 226, 235 (nest, fig.), 236.
  Baird, 235.
  Brandt, 235.
  double-crested, 175-177 (gen., fig.).
Crane, 9, 10.
  Florida, 15.
  sandhill, 172, 237.
  white, 10 (fig.).
  whooping, 201.
Crow, 11, 114, 169, 170, 177, 203, 235, 341 (thriving gen., fig.), 366-367 (as villain, gen., fig.).
Cuckoo, 148.
Curlew, long-billed, 172.
Dove, 9 (fig.), 238.
  mourning, 121.
Duck, 10, 11.
  baldpate, 41.
  black, 177, 178, 298.
  butterball, 41.
  canvasback, 41, 113, 127, 233.
  cinnamon teal, 172
  English, 217.
  French, 217.
  gadwall, 26 (fig.), 41, 172.
  Indian, 217.
  mallard, 113, 126, 132, 172, 178, 217 (fig.), 233, 298.
  mandarin, 11 (fig.).
  pintail, 172, 178, 233, 298.
  redhead, 27 (fig.), 41, 172, 233.
  ruddy, 41, 127, 172.
  scaup, 41.
  spoonbill, 202.
  teal, 202, 298.
  whistler, 41.
  wood, 104.
Eagle, American, 236.
  bald, 106 (conservation, gen.), 237, 238.
  golden, 303, 305.
Egret, 237.
  American, 15, 172, 173.
  snowy, 26 (fig.), 27.
Emu, 146.
Falco columbarius, 305.
Falco peregrinus anatum, 305.
Falcon, peregrine, 305 (gen., fig.).
Finch, Sclater's, 145, 146.
Flicker, 147, 192.
  red-shafted, 127.
Flycatcher, silky, 340.
Goldfinch, American, 7.
Goose, 126 (gen.).
  Canada, 104, 113, 172.
  lesser snow, 201.
  snow, 200 (fig.), 201-204 (gen., fig.).
Goshawk, 234.
Grackle, bronzed, 254.
Grebe, eared, 172.
  pied-billed, 71.
  swan, 172.
  western, 172 (fig.).
Grosbeak, evening, 170.
  rose-breasted, 135.
Grouse, 103, 104, 106, 138, 139, 270, 271.
  ruffed, 139 (fig.), 234.
  sage, 173.
Guillemot, 236.
  pigeon, 235.
Gull, 176, 235, 236.
  California, 171, 172.
  glaucous-winged, 235, 236 (nest, fig.).
  ringed-billed, 172.
  western, 226-228 (gen., fig.).
Hawk, 14, 108, 114, 169, 170, 183, 237, 305, 338.
  Cooper's, 234.
  duck, 305 (fig.).
  European sparrow, 157 (fig.).
  marsh, 170, 203, 237.
  pigeon, 305.
  red-shouldered, 237.
  red-tailed, 237.
  sharp-shinned, 157, 234.
  sparrow, 237.
Heath hen, 114.
Heron, 9, 104, 235, 237.
  black-crowned night, 172.
  gray, 10.
  great blue, 109-110 (gen., fig.), 172.
  night, 172.
  Ward's, 15.
  white, 10.
Heteralocha acutirostris, 280.
Hornbill, crested, 296 (fig.).
Huia, 280 (gen., fig.).
Hummingbird, 170, 254, 276.
Ibis, 237.
  glossy, 171.
  white-faced glossy, 27 (fig.).
Indigo bunting, 7.
Jacksnipe, 172.
Jay, 234, 238.
  blue, 121, 132, 254, 264 (fig.), 265-267 (gen., fig.).
Junco, 147 (fig.), 331.
Killdeer, 172.
Kingbird, 148.
Kingfisher, 114, 135.
Kiwi, 146.
Lark, 12, 238.
Larus occidentalis, 226.
Lyrebird, 76 (gen., fig.).
Magpie, 11, 12, 334.
Martin, 147.
Meadowlark, 71, 207 (gen., fig.).
Menura superba, 76.
Mockingbird, 135, 192, 218.
Nightingale, 12.
Nutcracker, Clark's, 215 (gen., fig.).
Nuthatch, 147, 170.
  white-bellied, 71.
Oriole, 192.
  Baltimore, 7.
  orchard, 148.
Ostrich, 146.
Owl, 11, 14, 108, 114, 147, 169, 184, 237, 338.
  barn, 127, 170.
  barred, 237.
  Florida burrowing, 15-17 (gen., fig.).
  great horned, 210, 234, 237.
  long-eared, 36 (fig.).
  pigmy, 168 (fig.).
  screech, 170.
Parrot, 82, 306.
  gray, 295 (fig.).
Partridge, 334.
Pelican, 226, 235.
  white, 172.
Penguin, emperor, 132.
  Humboldt, 168 (fig.).
Petrel, 170.
  Leach's, 87.
Phainopepla nitens, 340.
Phalarope, Wilson's, 172.
Pheasant, 114, 184, 241 (fig.).
Pheasants, Lives and Homes, 121 (rev.).
Phoebe, 147.
Phoenix, 10.
Pigeon, 305.
  passenger, 114, 305.
  wood, 146.
Ptarmigan, 106.
Puffin, 87-88 (gen., fig.), 236.
  tufted, 235.
Quail, 270.
Quail, bobwhite, 114, 139 (fig.), 234, 236 (Alabama), 237-238 (gen., fig.), 271.
  California, 153 (fig.).
  Gambel's, 234.
Rail, Virginia, 210 (gen., fig.).
Raven, 127, 234.
Roadrunner, 234.
Robin, 126, 147, 218, 254, 331, 340.
Sandpiper, 104.
Sea parrot, 87.
Shrike, 234.
Snipe, Wilson's, 172.
Sora, 127.
Sparrow, English, 114, 118.
  European, 305.
  song, 275.
  tree, 147.
Spheniscus humboldti, 168 (fig.).
Starling, 114, 305.
Stilt, black-necked, 172.
Stork, white, 334.
Swallow, 10.
  bank, 147.
  barn, 118, 147.
  tree, 147.
Swift, chimney, 147.
Tanager, 148.
Tern, 176, 235.
  Arctic, 87.
  black, 127, 172.
  Caspian, 172.
  common, 87.
  Forster, 172.
Thrasher, 148.
  brown, 348 (nest, fig.).
Thrush, 12.
  hermit, 71.
  trembleur, 145, 146.
  varied, 331.
  Wilson's, 7.
  wood, 348 (nest, fig.).
Turkey, 114.
  wild, 138 (fig.), 139, 237, 271.
Vireo, 148.
  red-eyed, 71.
Vulture, turkey, 370.
Wag-tail, 11.
Warbler, 148.
  Audubon, 340.
  black-throated blue, 71.
Water thrush, 104.
Wavey, 201.
Waxwing, Bohemian, 328-331 (gen., fig.).
  cedar, 7, 168 (fig.), 330.
Willet, 27 (fig.), 172.
Woodcock, 103, 104, 242.
Woodpecker, 135, 238.
  downy, 125, 147, 148 (fig.).
  ivory-billed, 135.
  red-headed, 7, 135.
Wren, cactus, 12 (gen., fig.).
  house, 25.
  long-billed marsh, 25 (fig.).
  winter, 25.

CONSERVATION

American Wildlife Institute, 46.
Ammunition, sold annually, 367.
Boys and conservation, 174 (gen.).
Bureau of Fisheries and conservation, 299-303 (gen., fig.).
Conservation, California Condor, 368-370 (gen., fig.).
  crow, 366-367 (gen., fig.).
  rodent control, 363-365 (gen., fig.).
  slogans, 254.
  waterfowl, 41 (gen.), 113 (gen.), 126, 169 (gen.), 178 (baiting), 233-234 (gen.), 367 (closed season).
  wild flowers, 111-112 (gen.).
  wildlife, 42 (gen.), 111-112 (gen.), 170 (gen.), 234 (gen.), 241-242 (gen., fig.).
Conservation Society, Hudson River, 317 (rev.).
Dern-Lonergan Conference, 43, 44.
Duck Shooting Stories, 177 (rev.).
Duck stamp, third, 113 (gen.).
4-H Clubs and conservation, 169-170 (gen.).
Framing the Birds of Prey, 108 (rev.).
General Wildlife Federation, 42.
Hunters and ammunition, 367.
Indiana Audubon Yearbook, 320 (rev.).
Lonergan stream-pollution bills, 43.
Malheur Lake, 171-173 (gen., fig.).
Michigan Waterfowl Management, 179 (rev.).
Nature Clubs, Ohio Federation, 254.
Public Health Service, 242 (gen.).
Rodents and conservation, 363-365 (gen., fig.).
Santee-Cooper project, 42 (gen.).
Signs of the Times, 238 (billboard, poem).
Sportsmen and conservation, 304 (gen.).
Sportsman versus game, 241-242 (gen., fig.).
Stream pollution, 43-46 (gen., fig.).
Southern Sportsman, 255 (periodical).
Vermont Wildlife Federation, 240.
Voters and conservation, 297-298 (gen.).
Wanted: More Targets, 361-362.
Wildlife (W. Va.), 114 (gen.).
Wildlife lectures, 112.
Women and wildlife conservation, 304 (gen.).

FISHES

Bass, 176.
  large-mouthed black, 160 (fig.).
  small-mouth black, 88 (gen., fig.).
Carp, German, 114.
Catfish, 175, 203.
Cunner, 176.
Eel, 175.
Garfish, 114.
Gunnel, 176.
Herring, 176.
Luzon fish, 212.
Minnow, 88.
Mistichthys luzonensis, 212.
Muskellunge, 160.
Perch, sun, 203.
  yellow, 174.
Pickerel, 88, 176.
Pike, 176.
  northern, 160 (fig.).
Salmon, 107, 175, 176, 297, 299, 300 (fig.), 301, 303.
  Alaska red, 299 (fig.), 300, 301.
  chinook, 108.
  conservation, 107-108 (gen.).
Sculpin, 176.
Shiner, 88, 176.
Sucker, 110, 175.
Trigger fish, 8 (fig.).
Trout, 109, 114, 175, 176.
  brook, 104, 160 (fig.).
  rainbow, 160 (fig.).

FORESTRY

Here are Forests, 317 (rev.).
Kno Wood, 261 (booklet).
National Forest, Croatan, 255.
Our friends the Trees, 319 (rev.).
Sesquicentennial Tree Planting, 127.
Shade tree commission, 239, 240.
Tales of Lumber Camp, 319 (rev.).
Trees for highways, 239-240 (gen., fig.).
Yale Forest School wood collection, 254.

HIKING AND TRAILS

American Youth Hostels Handbook, 122 (pamphlet).
Bushwalking and Camping, 124 (rev.).
Campers' Handbook, 122 (rev.).
Camping Holidays, 122 (pamphlet).
Cookery for Camp and Trail, 58 (booklet), 186 (pamphlet).
Guide to Southern Appalachians, 122 (pamphlet).
Hiking and camping, 58, 60, 122, 124, 186, 188, 189, 250, 252, 253, 311, 315, 316, 373.
Loch Lomond Guide, 122 (pamphlet).
Outdoor Guide, 122 (pamphlet).
Pacific Coast Trail System, 124 (rev.).
Pestiferous Months Ahead, 58 (booklet).
Publicity for Hiking Trails, 122 (pamphlet).
Rambler's Handbook, 122 (pamphlet).
Scottish Hostels Handbook, 122 (rev.).
Storm King Mountain, 121.
The 25 Famous Mountains, 124 (rev.).
Walking in Dorset, 189 (rev.).

INSECTS AND OTHER INVERTEBRATES

Amoeba proteus, 159 (fig.).
Ant, 14, 21, 22.
  Little Black, 318 (rev.).
Aphid, 51, 59.
Aphis lion, 51 (fig.), 52.
Apiatia, 63 (rev.).
Aranea mactans, 90.
Bee, 21 (eye, fig.), 132, 140, 141.
  honey, 21, 22, 24 (gen., fig.), 140 (fig.), 243-244 (gen., fig.).
Beetle, 14, 15, 17, 110, 118, 270.
  Colorado potato, 40 (fig.).
  scarab, 334.
  whirligig, 22.
Boll weevil, 132.
Borer, squash-vine, 40 (fig.).
Brachiopod, 214-215 (gen., fig.).
Bug, giant water, 110.
  mallow, 22.
Butterfly, 21.
  black swallow-tail, 40 (larva, fig.).
  mourning-cloak, 275.
Caterpillar, 14, 216, 268.
  tent, 28 (fig.), 29 (fig.).
Cephalopod, 214.
Chalcis ovata, 86.
Clam, 106, 214, 306.
Cockroach, 357-358 (gen., fig.).
Coral, 8 (fig.).
  gorgonid, 19.
Crab, 19, 106.
  hermit, 100 (fig.).
  horseshoe, 100 (fig.).
  kelp, 99 (fig.).
  king, 100 (fig.).
  spider, 99 (fig.).
Crawfish, 15, 17, 27, 88, 110, 306.

Cricket, 248, 270.
  Jerusalem, 248.
Crinoid, 214, 215.
Didinium nasutum, 158 (fig.).
Diopsis, 22.
Dragonfly, 21 (eye, fig.), 22, 110.
Earthworm, 306, 307.
Eupagarus bernhardus, 100.
  longicarpus, 100.
  pollicaris, 100.
Firefly, 17.
Fly, 13, 14.
  horse, 21, 22.
  house, 21.
  lace-wing, 51 (fig.), 52.
Gaurax araneae, 286-288 (gen., fig.).
Glowworm, 17 (gen., fig.).
Grasshopper, 170, 266, 270.
Gyrinus, 22.
Hellgrammite, 88.
Hemerocampa leucostigma, 85.
Hornet, 216 (gen., fig.).
  white-faced, 216.
Insect eyes, 21-22 (gen., fig.).
Invertebrate Paleontology, 190 (rev.).
Jellyfish, 20.
June bug, 4.
Katydid, 183, 184.
Latrodectus mactans, 90.
Leech, 98 (gen., fig.).
Leptinotarsa decimlineata, 40 (fig.).
Lycosa scutulata, 211.
Malacosoma americana, 28.
  disstria, 28.
Mantis, praying, 4 (gen.).
Mayflies, Biology of, 65 (rev.).
Melittia satyriniformis, 40 (fig.).
Mosquito, 56.
Moth, 118.
  cynthia, 125.
  gypsy, 86.
  white-marked tussock, 85-86 (gen., fig.).
Nautilus, 214.
Oyster, 82.
Papilio polyxenes, 40.
Paramecium caudatum, 158 (fig.).
Periwinkle, 215.
Pimpla inquisitor, 86.
Pleuromonas jaculans, 212.
Protoparce quinquemaculata, 40 (fig.).
Sea anemone, 19-20 (gen., fig.).
Sea spider, 99 (fig.).
Shell, lamp, 214, 215.
Snail, 27, 106, 204, 214, 215, 298, 306.
Spider, 14, 216.
  black widow, 90-94 (gen., fig.), 286 (fig.), 287, 288.
  Nephila, 4 (gen.).
  trap-door, 20 (gen., fig.).
  wolf, 211 (gen., fig.).
Squid, 214.
Stenopelmatus, 248 (gen., fig.).
Stentor coeruleus, 159 (fig.).
Theridiidae, 90.
Trilobite, 214.
Trumpet animal, 159 (fig.).
Vespa, 216.
Volvox minor, 159 (fig.).
Wasp, 142, 216.
  mud-dauber, 216.
  potter, 216.
Worm, corn ear, 132.
  tobacco, 40.
  tomato, 40 (fig.).
Yellow-jacket, 215, 216.

MAMMALS

American Society Mammalogist's meeting, 47, 64 (gen.).
Antelope, 172, 173.
Armadillo, 234.
Baby, Indian, 350 (fig.).
Badger, 102 (fig.), 338.
Bat, 14, 56.
Bear, 52 (gen., fig.), 80, 106.
  grizzly, 170.
Beaver, 101 (fig.), 104, 110, 114, 119 (gen., fig.), 171, 283-285 (gen. fig.).
Bison, wood, 64.
Bobcat, 234.
Buffalo, 170, 172, 234.
Canis fulvus, 271.
  vulpes, 271.
Caribou, 32 (fig.), 64.
Castor canadensis, 101 (fig.).
Cat, 5, 82.
  domestic, 114, 118, 119, 147, 234, 264 (fig.), 266, 267.
Cervus canadensis, 31.
Chipmunk, 71, 114, 234, 270, 291.
  eastern, 223-225 (gen., fig.).
Citellus tridecemlineatus, albino, 338 (gen., fig.).
Coney, 18.
Coyote, 202, 203, 234, 272, 338.
Deer, 106, 114, 173, 237, 241, 254, 270.
  mule, 31 (fig.), 32 (fig.).
Dog, 234.
  beagle hound, 126.
  Boston terrier, 346 (fig.).
  collie, 272, 347 (fig.).
  Dobermann pinscher 347 (fig.).
  English bulldog, 346 (fig.).
  English setter, 347 (fig.).
  fox hound, 346 (fig.).
  German shepherd, 345 (fig.).
  great Dane, 347 (fig.).
  St. Bernard, 345 (fig.).
  setter, 346 (fig.).
  Siberian husky, 345 (fig.).
  water, 114.
Dog booklet, 132 (rev.).
Dogs, Cats, and Monkeys, 121 (rev.).
Dolphin, 47.
Elephant, 5 (intelligence), 18.
Elk, 31 (fig.).
Ermine, 184.
Ferret, black-footed, 338.
Fiber zibethicus, 102 (fig.).
Fisher, 114.
Footsteps of Wild Animals, 137-139 (gen., fig.).
Fox, 338.
Fox, Arizona gray, 234.
  black, 272.
  cross, 272.
  gray, 114, 234.
  red, 234, 269-272 (gen., fig.), 317.
  silver, 272.
Gibbon, 18.
Gopher, 110.
Guinea pig, 306.
Honey-bear, 80.
Hyrax, 18 (gen., fig.).
Hyrax capensis, 18.
  syriacus, 18.
Kinkajou, 80-82 (gen., fig.).
Lemur, ruffed, 18.
Lion, African, 296 (fig.).
Mammals, Life Zones, Oregon, 31 (rev.).
Marten, 101 (fig.), 114.
Mink, 14, 104, 114, 127.
  Maine giant, 114.
Mole, 184.
Monkey, 80, 306.
Monotremata, 204.
Moose, 30 (fig.).
Mouse, 110, 114, 184, 270, 271.
  deer, 216.
  field, 147.
  meadow, 308 (gen.), 349 (nest, fig.).
  waltzing, 306, 307.
  white, 306.
  white-footed, 349 (nest, fig.).
  wood, 348 (nest, fig.).
Musk-oxen, 64, 102 (fig.).
Muskrat, 71, 102 (fig.), 104, 171, 306, 308.
Muskrat house, 349 (fig.).
Odocoileus macrotis, 31.
Opossum, 14, 234.
Ornithorhynchus anatinus, 204.
Otter, 114, 171.
Ovibos moschatus, 102.
Palaeothere, 18.
Peccary, 18.
Peromyscus leucopus, 348 (nest, fig.).
Platypus, duck-billed, 204 (gen., fig.).
Porcupine, 169, 174.
  South African, 18.
Porpoise, 47.
Rabbit, 81, 114, 118-119 (gen., fig.), 146, 236, 270, 271, 306, 307.
  antelope jack, 363 (fig.).
  cottontail, 203, 349 (form, fig.).
  jack, 203.
Rabbit-skin cap, 350 (fig.).
Raccoon, 80, 103, 114, 183, 199, 234.
Rat, 5, 114, 270.
  cotton, 234.
  hooded, 306, 308.
  kangaroo, 306, 307, 308.
  white, 306, 308.
Rhinoceros, 18.
Sable, 101.
Seal, fur, 299, 301 (fig.), 302 (fig.), 303.
  great gray, 87.
  harbor, 87.
  hooded, 87.
Sheep, desert bighorn, 192.
  mountain bighorn, 316.
  Nelson's mountain, 192.
  Stone's, 64.
  white, 64.
Shrew, 14 (gen., fig.), 110, 184.
  long-tailed, 14.
  short-tailed, 14.
Skunk, 14, 80, 81, 234, 338.
Sloth, 18.
Squirrel, 138, 139, 174, 270, 271, 306.
  fox, 289.
  gray, 137, 289.
  ground, 71, 110, 270, 338 (albino, gen., fig.).
  Kurdistan, 332-334 (gen., fig.).
  red, 114, 234.
  round-tailed ground, 234.
Squirrel's Granary, 197 (rev.).
Stoat, 146, 184.
Unicorn, 10.
Vulpes fulva abietorum, 317.
Vulpes fulva alascensis, 317.
Vulpes fulva bangsi, 317.
Vulpes fulva cascadensis, 317.
Vulpes fulva deletrix, 317.
Vulpes fulva fulva, 272.
Vulpes fulva harrimani, 317.
Vulpes fulva kenaiensis, 317.
Vulpes fulva macroura, 317.
Vulpes fulva necator, 317.
Vulpes fulva regalis, 317.
Vulpes fulva rubricosa, 317
Vulpes fulvus, 271.
Weasel, 14, 114, 146, 147, 169, 184 (gen., fig.), 234, 265, 338.
Whale, 47.
Wolf, 234, 270, 271.
  timber, 114.
Wolverine, 114.
Woodchuck, 183, 270.
Zebra, 295 (fig.).

NATURE EDUCATION

Along Nature's Trails, 57 (rev.).
Chalk for Nature Study, 244 (gen., fig.).
College Biology, 121 (rev.).
Garden lectures, 121.
Hedge Folk in Twilight, 121 (rev.).
Nature calendar, 7, 71, 127, 135, 199, 263, 327.
Nature education, 120.
Nature Guiding on Wheels, 121 (rev.).
Nature Magazine in school, 56, 120, 185, 249, 314, 375.
Nature poem contest, 59.
Nature science in school, 306 (gen., fig.).
Nature study, bee, 243-244 (gen., fig.).
Nature Study Projects, 319 (rev.).
Trailside Treasures, 51-52, 117-118, 183-184.

PARKS AND REFUGES

Bird Study, Grand Canyon, 121 (bull.).
Desert Game Range, 192.
El Morro, 79 (fig.).
Geology, Grand Canyon, 190 (rev.).
Grand Canyon Region, History and Exploration, 121 (bull.).
Hawk Mountain Sanctuary, 303.
High Trails of Glacier Park, 252 (rev.).
Horicon Marsh, 48, 298 (gen.).
International Wilderness Park, 48.
Mammals, Grand Canyon, 121 (bull.).
Michigan Wildlife sanctuaries, 255.
National Monument, Pulaski, 133.
National Park Booklets, 122 (rev.).
National monuments, 105 (gen.).
Nature Sanctuary Society, Western New York, 111.
Olympic Primitive Area, 254.
Palisades Interstate Park, 124, 197
Petrified Forest, 123.
Pleasant Valley Sanctuary, 101, 103-104 (gen., fig.).
Quetico Provincial Park, 48.
Sanctuary News (periodical), 48.
Superior National Forest, 48.
Trees, Grand Canyon, 121 (bull.).
Yellowstone Plants, 121 (booklet).

PLANTS, GENERAL

Abronia, 71.
Adiantum pedatum, 150.
Alfalfa, 120.
Algae, Life Relations, 65 (rev.).
Allium trichocoleum, 96 (fig.).
Amanita chlorinesma, 39 (fig.).
Apples of Sodom, 95 (fig.).
Anemone, blue, 334.
  scarlet, 334.
  white, 334.
Anemone coronaria, 97 (fig.).
Armillaria mellea, 154 (fig.).
Asclepias amplexicaulis, 163 (fig.).
Asphodel, giant, 344.
Asplenium, 150.
Aster, purple, 166 (fig.).
Aster patens, 166 (fig.).
Athyrium angustifolium, 149 (fig.).
Banana, 82.
Barley, 126.
Basil, 261.
Bennettitales, 279, 293.
Blazing star, 13.
Blue-curl, 142.
Botrychium, 150.
Bowenia, 279.
Buckbean, 111.
Buckwheat, 141.
Bush-clover, 335.
Buttercup, 275.
Callipteris raymondi, 278 (fig.).
Camptosorus rhizophyllus, 150.
Cardinal flower, 112.
Carnation, 128.
Carrot, 40.
Celery, 40.
Ceratozamia, 279.
Chamaeperion angustifolium, 166 (fig.).
Chickweed, 212.
Chives, 261.
Clintonia, white, 152 (gen., fig.).
Clintonia borealis, 152.
Clitocycbe illudens, 39 (fig.), 155 (fig.).
Clover, 140, 141.
  bush, 335.
  sweet, 120.
Colchicum decaisnei, 95 (fig.).
Colchicum sativum, 95.
Colchicum stevensi, 95 (fig.).
Colotropis procera, 95 (fig.).
Columbine, white, 71.
Common Mushrooms, 319 (rev.).
Cordyline australis, 146.
Corn, 126.
Cortinarius ioides, 209.
Cucumber, 276.
Cuscuta gronovii, 162 (fig.).
Cycad, 123, 278-280 (gen., fig.), 292-294 (gen., fig.).
Cycadales, 279, 293.
Cycadeoidea, 292.
Cycadoeidea etrusca, 279.
Cycadofilicales, 278, 279, 293.
Cycadophyta, 278.
Cycas, 279.
Cycas beddomei, 294 (fig.).
Cycas revoluta, 294 (fig.).
Cyclamen, 97 (fig.).
Cyclamen aleppicum, 97.
Cyrtopodium punctatum, 148 (gen., fig.).
Dahlia, 83.
Daisy, 277, 334.
Dandelion, 276 (fig.), 277.
Day lily, 83-84 (gen., fig.).
Delphinium, 83, 84.
Dennstaedtia punctilobula, 150, 151 (fig.).
Desert candle, 344 (gen., fig.).
Dionaea muscipula, 13.
Dioon, 279.
Dioon edule, 280, 293 (fig.).
Dioon spinulosum, 280.
Dodder, 162 (fig.).
Duck's meat, 212.
Duck's meat, pigmy, 212, 213.
Eelgrass, 19, 20.
Encephalartos, 279.
Encephalartos caffer, 293 (fig.).
Encephalartos lehmannii, 294 (fig.).
Eremurus, 344 (gen., fig.).
Eremurus bungei, 380.
Eremurus elwesianus, 380.
Eremurus himalaicus, 380.
Eremurus himrod, 380.
Eremurus robustus, 380.
Eremurus shelfordi, 380.
False lily-of-the-valley, 162 (fig.).
False Solomon's seal, 161 (fig.).
Fern, 146, 149-152 (gen., fig.), 278.
  adder's tongue, 150.
  American, 192 (rev.).
  Christmas, 150.
  cinnamon, 111, 150.
  hay-scented, 150, 151 (fig.).
  interrupted, 150 (fig.).
  maiden-hair, 150.
  marginal shield, 149 (fig.).
  moonwort, 150.
  narrow-leaved spleenwort, 149 (fig.).
  Osmunda, 150.
  ostrich, 150, 151 (fig.), 152.
  purple cliff-brake, 150.
  rock polypody, 149 (fig.), 151.
  royal, 111, 150.
  sensitive, 150.
  spinulose wood, 150 (fig.).
  spleenwort, 150.
  walking, 150.
  water, 150.
  tree, 150.
Fern Handbook, 190 (rev.).
Ferns, New York, 192 (rev.).
Festuca, 22.
Festuca elatior, 22.
Festuca littoralis, 22.
Festuca rubra, 22.
Fireweed, 166 (fig.).
Fistulina hepatica, 156 (fig.).
Flax, 71.
Flower Folk, 121 (rev.).
Flowers to Grow and Gather, 123 (rev.).
Flowers under Microscope, 275-277 (gen., fig.).
Fomes applanatus, 156 (fig.).
Four Seasons in Garden, 187 (rev.).
Fungi, 154-156 (gen., fig.).
Fungus, bracket, 336.
Garden Encyclopedia, 57 (rev.).
Gentian, 34.
Geranium, rose, 261.
Gladiolus, 83.
Goldenrod, 141, 166.
Grass, blue, 22.
  blue fescue, 22 (fig.).
  bunch, 171.
  centipede, 133.
  cotton, 111.
  crab, 211.
  English blue, 22.
  fescue, 22 (gen., fig.).
  meadow fescue, 22.
  red fescue, 22.
  shade fescue, 22.
  sheep's fescue, 22.
  Sudan, 120.
Green and Gold, 190 (banana, rev.).
Habenaria ciliaris, 34 (fig.).
Habenaria orbiculata, 35 (fig.).
Hemerocallis, 83, 84.
Hemerocallis multiflora, 84 (fig.).
Honeysuckle, 140.
Hydnum caputursi, 154 (fig.).
Ice plant, 228.
Illustrated Flora, U. S., 59 (rev.).
Iris, 77, 78, 83, 84.
Iris missouriensis, 78 (fig.).
Jasmine, 146.
Kelp, 99.
Ladies' tresses, 34 (fig.).
Lady-slipper, 187.
  pink, 35 (fig.).
  showy, 33 (fig.), 112.
  white, 35 (fig.).
  yellow, 112.
Larkspur, 140.
Lavender, 128.
Lemna, 212.
Lichen, 336.
Lily, 275 (fig.), 276.
Lily-of-the-valley, 128.
Lomaria, 279.
Loosestrife, 111.
Lotus, American, 162 (fig.), 187.

Lupine, 163 (fig.).
Lupinus perennis, 163 (fig.).
Lycoperdon pyriforme, 156 (fig.).
Lyginopteris oldhamia, 279 (fig.)
Macrozamia, 279.
Macrozamia denisoni, 280 (fig.).
Marattia, 151.
Mertensia, 71.
Mesembryanthemum, 228.
Microcycas, 279.
Milkweed, 335, 336 (fig.).
  blunt-leaved, 163 (fig.).
Millet, 126.
Mint, 261.
Moccasin flower, 111, 112 (pink).
Monkshood, 71.
Moss, 139, 336.
  club, 335 (fig.).
  sphagnum, 111, 112.
Mushroom, 13, 209-210 (gen., fig.).
  bear's head, 154 (fig.).
  beefsteak, 156 (fig.).
  chicken, 156 (fig.).
  honey, 154 (fig.).
  jack-o'-lantern, 39 (fig.), 155 (fig.).
  lime, 39 (fig.).
  pear-shaped puffball, 156 (fig.).
  sulphur, 39 (fig.).
Mushroom Handbook, 63 (rev.).
Narcissus tozetta, 96 (fig.).
Nectria, 251 (gen., fig.).
Nelumbo lutea, 162 (fig.).
Onion, wild, 96 (fig.).
Onoclea sensibilis, 150.
Ophioglossum, 150.
Orchid, 33, 34, 35, 84, 112, 187.
  cigar, 148 (gen., fig.).
  grass pink, 112.
  snake mouth, 112.
Orchis, purple-fringed, 112.
  white-fringed, 112.
Osmunda claytoniana, 150 (fig.).
Osmunda cinnamomea, 150.
Osmunda regalis, 150.
Palestine flowers, 95-97 (gen., fig.).
Parsley, 40, 261.
Pellaea atropurpurea, 150.
Peony, 83, 84, 128.
Phytolacca americana, 222 (fig.).
Pink, clove, 128.
Pitcher plant, 111.
Pleurotus corticatus, 155 (fig.).
Pleurotus ulmarius, 155 (fig.).
Poa, 22.
Pokeweed, 222 (fig.).
Pollen, 72-76 (gen., fig.), 276 (fig.).
Pollen Grains, 192 (rev.).
Polypodium virginianum, 149 (fig.), 151.
Polyporus sulphureus, 156 (fig.).
Polystichum acrostichoides, 150.
Poppy, Oriental, 84.
Psaronius, 278.
Pteretis nodulosa, 150, 151 (fig.), 152.
Pyxie, 13, 212.
Ragweed, 72 (pollen, fig.), 75 (pollen, fig.), 76, 276.
Rattlesnake plantain, 35 (fig.).
Rice, wild, 298.
Romulea bulbocodium, 96 (fig.).
Rose of Sharon, 96.
Rosemary, 141.
Rush, club, 171.
Saffron, meadow, 95 (fig.).
Sandwort, 212.
Saxifrage, swamp, 111.
Schizophyllum commune, 156 (fig.).
Skunk cabbage, 140 (fig.).
Smartweed, 298.
Solomon's seal, 163 (fig.).
Southern Appalachian Botany Club, 59.
Sorghum, 120.
Sorrel, red, 336.
Spiranthes romanzoffiana, 34.
Stangeria, 279, 280.
Stitchwort, 212.
Sundew, 111.
Sun-dial, 163 (fig.).
Sunflower, 71, 120, 277.
Supaia thinnfeldioides, 293 (fig.).
Sweet marjoram, 261.
Tar weed, 71.
Thelypteris marginalis, 149 (fig.).
Thelypteris spinulosa, 150 (fig.).
Thyme, wild, 141.
Tobacco flower, 275 (fig.).
Tomato, 276.
Trillium, 187, 275, 276.
Tropical Garden, 190 (rev.).
Tule, 27, 171, 172.
Tulip, 83, 97 (fig.).
Unifolium canadense, 162 (fig.).
Vagnera racemosa, 161 (fig.).
Venus flytrap, 13-14 (gen., fig.).
Violet, 7, 140.
  English, 128.
Voltzia, 123.
Watercress, 261.
Wheat, 126, 202, 203, 204, 277.
Willow-herb, 166 (fig.).
Wolffia, 212-213 (gen., fig.).
Wolffia columbiana, 213.
Wolffia papulifera, 213.
Wolffia punctata, 213.
Zamia, 279.
Zamia furfuracea, 294 (fig.).
Zamia loddigesii, 294 (fig.).
Zamia vanhoutei, 293 (fig.), 294 (fig.).
Zostera, 20.

REPTILES AND AMPHIBIANS

Alligator, 237, 306, 307.
Dragon, 10.
Frog, 27, 36, 80, 88, 110, 203, 234, 270, 306, 307.
Lizard, 14, 306, 307.
  collared, 167 (fig.).
  desert iguana, 167 (fig.).
  glass snake, 167 (fig.).
Newt, 106, 306, 307.
Rattlesnake, 61 (albino), 77, 78, 138.
  diamondback, 138.
Reptiles of North America, 261 (rev.).
Salamander, 306.
Snake, 14, 17, 110, 114, 138, 234, 306, 307.
  banded water, 61.
  black, 138.
  carpet, 5.
  corn, 51.
  garter, 3 (fig.).
  king, 138.
Swift, 78.
Terrapin, 114.
Toad, 14, 234, 306, 307.
  horned, 78.
Tortoise, 10.
  box, 234.
  gopher, 16.
Turtle, 61, 114, 169, 306, 334.
  alligator snapping, 98.

TREES AND SHRUBS

Alder, 104, 335 (fig.).
Apple, 85, 137, 244, 251, 271.
Araucaria, 123.
Arbutus, trailing, 187.
Ash, mountain, 220 (fig.), 221.
  green, 320.
  white, 161 (fig.).
Astrophytum asterias, 24.
Astrophytum capricorne, 24.
Astrophytum myriostigma, 23, 24.
Astrophytum ornatum, 24.
Azalea, 209.
Basswood, 141, 244.
Bayberry, 336.
Beech, 154.
  American, 291 (fig.).
Big tree, 205 (fig.), 206.
Birch, 268, 320.
Bittersweet, climbing, 218 (fig.), 219 (fig.).
Blackberry, 271, 336.
Blueberry, 13, 270.
Bunchberry, 220 (fig.), 221.
Butternut, 290 (fig.), 291.
Buttonbush, 335, 336 (fig.).
Cabbage tree, 146.
Cactus, 105.
  Bigelow cholla, 12.
  bishop's cap, 23-24 (gen., fig.).
  mistletoe, 23.
Castanea dentata, 291 (fig.).
Catalpa, 24.
Cedar, 78.
  arbor vitae, 207.
  canoe, 207.
  eastern red, 205 (fig.), 206 (fig.), 207.
  giant, 207.
  incense, 205 (fig.), 207.
  northern white, 205 (fig.), 207.
  Port Orford, 205 (fig.), 206 (fig.), 207.
  red, 205, 356 (cones, fig.).
  southern white, 205 (fig.), 207.
  western red, 206 (fig.), 207.
  white, 205.
Celastrus scandens, 218 (fig.).
Chamaecyparis lawsoniana, 207.
Chamaecyparis thyoides, 207.
Cherry, 244, 276.
Chestnut, 156, 291 (fig.).
Chokecherry, 320.
Christmas trees, 337-338 (gen., fig.).
Conifers, fronded, 205-207 (gen., fig.).
Cornus canadensis, 220 (fig.), 221.
Cornus florida, 220 (fig.), 221.
Cottonwood, 85, 110.
Cranberry, American, 221 (fig.).
Creosote-bush, 339.
Cupressus, 207.
Cypress, 15, 148, 205, 206 (fig.), 207.
  bald, 207, 277 (knee, gen., fig.).
  funeral, 207.
  Gowen, 207.
  Italian, 207.
  Macnab, 207.
  Monterey, 205 (fig.), 207.
  mourning, 207.
Dewberry, 270.
Dogwood, 139, 147.
  flowering, 220 (fig.), 221.
Elderberry, 140 (blossom, fig.).
Elm, 155, 276.
  Chinese, 320.
Fagus grandifolia, 291 (fig.).
Fir, 105, 278.
Ginkgo, 278.
Gooseberry, 276.
Grape, 147, 271.
  wild, 138.
Greenbrier, 139, 268.
Gum, 209.
Hardy Fruits Cyclopedia, 255 (rev.).
Heather, 141.
Hemlock, 335 (fig.).
  American, 356 (cones, fig.).
  mountain, 207.
Hibiscadelphus giffardianus, 142.
Hibiscus, 142.
Hickory, 139, 289 (fig.).
  bitternut, 289 (fig.).
  mockernut, 289 (fig.).
  shag-bark, 289 (fig.).
  shell-bark, 289 (fig).
  swamp, 289 (fig.).
Hicoria alba, 289 (fig.).
Hicoria cordiformis, 289 (fig.).
Hicoria ovata, 289 (fig.).
Holly, 218, 335.
  American, 222 (fig.), 336.
  mountain, 111.
Hornbeam, 209.
Horse chestnut, 290 (fig.).
Ilex laevigata, 218 (fig.).
Ilex opaca, 222 (fig.).
Ironwood, 339, 341.
Ivy, 147.
  poison, 219 (fig.).
Juglans cinerea, 290 (fig.).
Juglans nigra, 290 (fig.).
Juniper, 205 (fig.), 206 (fig.), 207, 278.
  dwarf, 205 (fig.), 206.
  red, 147.
  Utah, 337 (fig.).
Juniperus virginiana, 356 (cones, fig.).
Koa, 142.
Larch, 335.
  European, 356 (cones, fig.).
Larix decidua, 356 (cones, fig.).
Laurel, bog, 111.
Leatherleaf, 111.
Libocedrus decurrens, 207.
Lilac, 128.
Logwood, 141.
Maple, 199.
  Norway, 7.
  sugar, 111.
Mistletoe, 335.
  desert, 339-341 (gen., fig.).
Mitchella repens, 221 (fig.).
Mountain hau, 142 (gen., fig.).
Nannyberry, 111.
Nut-bearing trees, 289-291 (gen. fig.).
Oak, 154, 156, 276.
  white, 147.
Ocotillo, 339.
Olneya tesota, 339.
Oxycoccus macrocarpus, 221 (fig.).
Palm, 105.
Palmetto, scrub, 15, 16.
Palo Verde, 12, 215.
Parthenocissus quinquefolia, 218 (fig.).
Partridge berry, 221 (fig.).
Peach, 244, 271.
Pear, 85, 244.
Pepperbush, 209.
Pereskia, 24.
Phoradendron californicum, 339-341 (gen., fig.).
Picea abies, 355 (cones, fig.).
Picea mariana, 355 (cones, fig.).
Pine, 38 (fig.), 139, 205, 276, 277, 278.
  longleaf, 13.
  Norway, 164 (fig.).
  nut, 337 (fig.).
  pitch, 335 (fig.), 354 (cone, fig.).
  red, 164 (fig.), 335 (fig.).
  Virginia, 354 (cone, fig.).
  white, 111, 112, 335 (fig.), 354 (fig.).
  white-barked, 37 (fig.), 38 (fig.).
Pinus albicaulis, 37 (fig.).
Pinus banksiana, 354 (cone, fig.).
Pinus resinosa, 164 (fig.).
Pinus strobus, 354 (cone, fig.).
Pinus virginianus, 354 (cone, fig.).
Plane tree, 333.
Plum, wild, 271.
Poplar, 276, 320.
  Lombardy, 7.
Pseudotsuga taxifolia, 355 (cones, fig.).
Raspberry, 271.
Redwood, 105, 170, 206.
Rhipsalis, 23, 24.
Rhododendron, 140.
Rhus toxicodendron, 219 (fig.), 222.
Rhus vernix, 222 (fig.).
Rose, 83, 84, 128.
  damask, 128.
  wild, 71, 268.
Sagebrush, 77, 78 (fig.).
Sago palm, 294.
Sandalwood, 142.
Sequoia, 170.
Serviceberry, 271.
Snowberry, 219 (fig.).
Sorbus americanus, 220 (fig.), 221.
Spanish bayonet, 12.
Spruce, 105, 205, 335, 336 (fig.).
  black, 355 (cones, fig.).
  Douglas, 355 (cones, fig.).
  Norway, 355 (cones, fig.).
Strawberry, 270.
Sumac, 141, 336.
  poison, 222 (fig.).
Sycamore, 85.
Symphoricarpos racemosus, 219 (fig.).
Thuja plicata, 207.
Trees, Field Manual, 197 (rev.).
Trumpet vine, 140.
Tsuga canadensis, 356 (fruit, fig.).
Tupelo, white, 142.
Vaccinium uliginosum, 7.
Virginia creeper, 218 (fig.).
Walnut, black, 251, 290 (fig.).
  white, 290 (fig.).
Whortleberry, 7.
Willow, 173, 203, 320.
  pussy, 141 (fig.).
Winterberry, smooth, 218 (fig.).
Wintergreen, 336.
Witch hazel, 274 (poem).
Woodbine, 147, 218 (fig.).
Yew, 7.
Yucca whipplei, 12.

WEATHER AND ASSOCIATED PHENOMENA

Atmospheric optics, 281-282 (gen. fig.).
Brocken spectre, 281.
Clouds, 37 (fig.).
Corona, 281.
Dew-bow, 281.
Fog-bow, 281.
Glory spectre, 281.
Halo complex, 281.
  lunar, 281.
  solar, 281, 282 (fig.).
Ice cave, 77 (fig.), 78, 79.
Mirage, 281.
Rainbow, 281 (fig.).
Spray-bow, 281, 282 (fig.).
Sun pillar, 282 (fig.).
Tornado, 229-231 (gen., fig.).

MISCELLANEOUS

Agate, moss, 143-144 (gen., fig.).
Alps, Canadian, 360 (winter, fig.).
Alps, Swiss, 359 (winter, fig.).
Ancient Artizans, 61 (rev.).
Biography, Bailey, Florence M., 71, 127.
  Bent, A. C., 263.
  Bolles, Frank, 199.
  Conrad, Timothy A., 273-274 (gen., fig.).
  Harris, J. Arthur, 63 (rev.).
  Johnson, Charles E., 69.
  Oastler, Frank Richard, 319.
  Russell, Carl P., 320.
  Thompson, James Maurice, 135.
  Whittier, J. G., 327.
  Wilson, Alexander, 7.
Canoe to Hudson Bay, 60 (booklet).
Christmas decorations, 335-336 (gen.).
Dappled Waters, 60 (poems, rev.).
Dendrite, 143.
Emerald, Brazilian, 208.
Fear is the Thorn, 4 (poems, rev.).
Frail Beauty, 82 (poem).
Glacier of the Angels, 360 (fig.).
Goblin Gulch, 351-353 (gen., fig.).
Green Laurels, 190 (rev.).
Honey, 140-142 (gen., fig.).
Indians at Work, 255 (rev.).
It Happened in Australia, 318 (rev.).
  in South Africa, 318 (rev.).
Journal, Henri Amiel, 192 (rev.).
Lake McAree, 164 (fig.).
Living Garden, 132 (rev.).
Monsters and Madonnas, 195 (rev.).
Mountain Neighbors, 57 (rev.).
Motor Car Trailers, 69 (rev.).
New Mexico, 77-79 (gen., fig.).
Noonmark, Flora and Fauna, 252 (booklet).
Northern Ontario, 60 (booklet).
Photography, 2 (color, booklet), 3, 55, 66-69, 130 (motion pictures), 131-132, 194-196, 258-260.
  Annual of Photography, 317 (rev.).
  Aristotle to Eastman, 132 (booklet).
  Better Snapshots, 259 (rev.).
  Camera Conversations, 196 (rev.).
  Camera Trails, Southwest, 132 (rev.).
  Composition Simplified, 69 (rev.).
  Elementary Photography, 187 (rev.).
  Fine Grain Negative, 68 (rev.).
  How to Use Your Camera, 68 (rev.).
  Inexpensive Movies, 130 (rev.).
  Itinerant Photographer, 132 (rev.).
  Modern Photography, 260 (rev.).
  Money Movie Outfit, 55 (booklet).
  Movie Parade, 260 (rev.).
  Movies in Color, 2 (booklet).
  Pictorial Lighting, 55 (rev.).
  Photo Markets, 68 (rev.).
  Photographic Digest, 132 (rev.).
  Projection Control, 55 (rev.).
  Rolleiflex Photography, 55 (rev.).
  You and Your Camera, 260 (rev.).
  Zeiss Proxars and Distars, 3 (book).
  Zeiss Yellow Filters, 68 (leaflet).
Physiology, Domestic Animals, 190.
Questionnaire, editorial policy, 247.
River Pasture, 133 (rev.).
Roadstand contest, 121.
Sea to Land, 4 (rev.).
Spinnings from Cobwebs, 187 (poems).
Stone faces, 351-353 (gen., fig.).
Sunset, 165 (fig.).
Tourmaline, 208 (gen., fig.).
Twenty Years Under Sea, 190 (rev.).
Uncommon Knowledge, 318 (rev.).
Unsolved Science Problems, 128 (rev.).
Zircon, 208.

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